X

PROGRESS REPORT

OF

FOREST ADMINISTRATION

IN THE

PUNJAB

FOR

1876-77,

By B. H. BADEN-POWELL, Esq., B.C.S.,
CONSERVATOR OF FORESTS:

WITH A REVIEW BY THE LIEUTENANT-GOVERNOR

AND

ORDERS BY THE GOVERNMENT OF INDIA.

1878.

No. 297F., dated Calcutta, 4th March 1878.

From—The Officiating Secretary to the Government of India,

To—The Officiating Secretary to the Government of the Punjab.

I AM directed to acknowledge the receipt of your letters Nos. 442F., dated the 11th December, and 7F., dated the 11th February last, forwarding the Annual Report of Forest Administration in the Punjab for 1876-77, together with the review by His Honour the Lieutenant-Governor, and to communicate the following observations and orders thereon by the Government of India.

2. The area of the reserved forests, for the good management of which the Conservator is responsible, is still uncertain. The statement (Form No. 45), recorded on pages 55 and 56, like other statements appended to the report, is not totalled, which is inconvenient. The totals, as worked out in this office, stand as follows:—

	Square miles.
On 1st April 1876	3,785
„ 31st March 1877	3,782

The first of these figures does not agree with the figures recorded as most likely to be correct in paragraph 7 of the orders by the Government of India on last year's report (No. 1108F., dated the 29th August last). The Conservator states that the needful corrections have been made; but the forests mentioned in paragraph 6 of those orders are again included in the list of demarcated reserves, which seems open to doubt.

3. In the matter of demarcation and settlement of forest rights, it is evident that a great deal yet remains to be done in the Punjab. The proposed demarcation of the leased forests in the Chamba State and of the forests in Kulu is adverted to by the Conservator, and the Governor-General in Council trusts that in his next report Mr. Baden-Powell will be in a position to report progress in this respect. The necessity of early demarcation is perhaps greater in the hill districts of the Punjab than in any other province of the Empire, for it is not only a permanent supply of timber, wood, and other forest produce that must be provided, but the evil consequences of denudation must be guarded against; and from several passages in the present and in previous reports it is evident that the mischief done by denudation has already been experienced in several instances.

4. The Conservator alleges the paucity of officers as the chief reason for the small progress hitherto made in this respect. The proportion of Forest officers in the Punjab on leave, as compared with other provinces, has of late years been very large. The Government of India has, however, lately strengthened the staff of superior officers in that province as far as the scale sanctioned by the Secretary of State will admit, and should His Honour consider that in addition to the sanctioned staff a separate staff should be employed solely on demarcation work, the Governor-General in Council will consider any definite proposals that may be made to that effect.

5. Forest business in the Punjab would, however, I am to observe, probably be in a more advanced state if the subordinate local establishments were more efficient and reliable. What is recorded in previous annual reports and in the present document regarding the dishonesty of several forest subordinates shows that not much progress has yet been made with regard to the efficiency of the subordinate establishments. From paragraph 5 of His Honour's review the Governor-General in Council is glad to notice that some improvement has been effected, and trusts that the Conservator fully recognizes the fact that a good subordinate staff is as necessary as a strong staff of superior officers.

6. The Governor-General in Council cordially assents to the remarks made by His Honour in paragraph 4 of his review regarding the necessity of professional training for the members of the subordinate forest staff: much can be accomplished in this respect by each Conservator in his own province. But the proposals submitted by the Government of the Punjab in your letter No. 182F. of the 11th May last, for the establishment of a Central School of practical

forestry, have been under consideration, and it is hoped that at an early date orders may be passed regarding them.

7. A commencement appears now to have been made in earnest to promote natural reproduction in the rakhs situated in the plains by closing selected portions, and by prohibiting the removal of the brushwood of *Zizyphus*. The results reported in this respect in paragraphs 77, 85, and 110 are good, and merit commendation.

8. The spread of self-sown mulberry under shade in the sissoo plantations, both sailaba and irrigated, as reported in paragraph 113, is satisfactory, and should by all means be encouraged. Where the ground is sufficiently moist to enable the mulberry to live, its mixture with the sissoo may be expected to guard against the risks to which a pure sissoo forest must always be exposed.

9. From paragraph 99, it is gathered that the planting of deodar in lines has been successful in Kulu; the progress of these operations will be watched with interest, and should be reported in detail in each Annual Forest Report.

10. I am to point out that there is a discrepancy in the total area of plantations at the commencement and close of the year. In the report for 1875-76, page 73, the area at the close of the year was stated to be 15,119 acres, on which Rs. 4,35,546 had been spent; but in Form No. 46, on page 58 of the present report, the area at the commencement of the year is said to be 12,661 acres, and the past expenditure Rs. 5,80,874. One thousand one hundred and eighty-five acres were, it is said, added during the year, so that the total area at the close of the year would amount to 13,846 acres, whereas only 13,808 acres are shown in the statement. The Conservator probably had good reasons for making these alterations, but unless they are explained, they are confusing and diminish the value of these annual returns.

11. The plan adopted in the present report, of recording under one subhead the result of all experiments with exotic trees, is a good one, and should be followed in subsequent reports.

The information collected in paragraphs 208 to 211 regarding the rates paid for timber operations and other works in the different Forest Divisions has been noticed with interest.

12. The financial results of forest administration in the Punjab are as yet subject to considerable fluctuations. Those of the last five years have been as follows:—

		1872-73.	1873-74.	1874-75.	1875-76.	1876-77.
		Rs.	Rs.	Rs.	Rs.	Rs.
Receipts		6,52,994	7,32,540	8,34,874	9,05,742	5,98,754
Charges	A—Conservancy and Works.	5,45,068	3,54,457	4,19,305	3,18,498	2,70,330
	B—Establishments	2,50,874	2,42,705	2,27,175	2,35,728	2,52,153
	Total	7,95,942	5,97,162	6,46,480	5,54,226	5,22,483
Surplus		Deficit. 1,42,948	1,35,378	1,88,394	3,51,516	76,271

The plan discussed in the last report, the adoption of which is reported in the present, of concentrating timber operations in one or two divisions at a time, is doubtless correct.

13. The present as well as last year's report contains injunctions to Divisional Officers, which would be appropriate in a circular addressed by the Conservator to his subordinates, but are out of place in an Annual Progress Report, which is intended to be a record of the work actually accomplished during the year.

14. In conclusion, I am directed to notice a few discrepancies in the statements attached to the report.

In the Annual Account Current (Form No. 50) the expenditure under A, Conservancy and Works and B, Establishments does not agree with the figures entered in the summary of expenditure (Form No. 49), thus :—

	Account Current (Form 50).			Summary of Expenditure (Form 49).		
	Rs.	A.	P.	Rs.	A.	P.
A—Conservancy and Works	2,81,472	12	6	2,70,329	10	9
B—Establishments . .	2,53,173	4	4	2,52,152	11	4
Total . .	5,34,646	0	10	5,22,482	6	1

In the Statement of outstandings and liabilities on account of contractors (Form No. 51) on page 64 of the report, the outstandings at the beginning of the year do not agree with the sum shown at the close of 1875-76 in Statement 23 on page 65 of last year's report, thus :—

	Rs.
At the close of 1875-76	1,10,392
At the beginning of 1876-77	1,10,821
Difference	429

The outstandings in the Ravi Division have been increased by Rs. 400, and in the Fuel Reserve Division by Rs. 29, but no explanation on the subject is given.

Proceedings of the Hon'ble the Lieutenant-Governor of the Punjab in the Department of Revenue, Agriculture and Commerce (Forests), — No 7F., dated 11th January 1878.

READ—

The Report of the Punjab Forest Administration for the year 1876-77, (received in print on the 3rd of November 1877.)

REMARKS.—The review of last year's report defined the present aims of the Punjab Forest Department. The policy adopted may be briefly described as the subordination of the work of exploiting forests to the work of organizing them, the principle being recognized that the department for some time to come must be more engaged in developing the forest resources of the Province, than in securing a large immediate income. The Government of India cordially assented to the remarks then made as to the considerations which should guide demarcations in the hills, and approved the proposals for the conduct of forest conservancy in the plains, subject to the necessity for slow and cautious progress in the extension of cultivation with reference to the needs of the rural population, and to the possible effects of denudation upon climate. The observations recorded on the necessity of establishing a closer connection between the working of the Forest Department and the general administration of the country were also endorsed by the Hon'ble the President in Council. This subject is understood to be under the consideration of the Financial Commissioner, and is no doubt also engaging the attention of the Conservator; and the Lieutenant-Governor will be glad at any time to receive from either of these officers suggestions for improving the relations between the district and forest staff, although the final adjustment must probably await the time when the demarcation and permanent assignment of selected areas to the several control of the respective authorities shall have been accomplished.

2. With the sanction of Government, and in accordance with the views above referred to, the system formerly pursued of working all the five rivers at once, has been abandoned, and for some years to come the progress of the Forest Department must be less estimated by the number of trees felled and sleepers brought to market, or by the amount of receipts from grazing and fuel; or in short by the balance of a large gross income against a large gross expenditure, than by the advance made in plantations, in reboisements, in the introduction of new species, in the formation of working plans, and in the demarcation and settlement of forest areas. Without demarcation efficient conservancy is impracticable; and demarcation brings with it the enquiry into and the definition of customary rights; whilst the Forest Bill now before the Legislative Council opportunely provides the machinery needed to assign to the several modes of enjoyment, their proper proportion and place. The next step, therefore, in the development of an efficient Government department, is the institution of forest settlements, in order to ascertain with regard to the lands coming under treatment what rights exist, whose such rights are, and, if they are incompatible with conservancy, how they may best be extinguished. The Lieutenant-Governor has, on previous occasions and with reference to particular cases, recorded remarks to this effect; but they are conveniently repeated here to show their connection with the general scheme of forest operations as it is being developed from year to year. The interest, however, attaching to a scheme of this kind should not be permitted to disturb the relative perspective in which the various functions of the State should be regarded, and it should always be remembered, and more particularly by Forest Officers themselves, that the proper economy of forests and waste lands, even when most largely understood, is merely one of the many modes in which Government discharges its duties to the people. The scientific considerations which trained officers rightly bring to bear upon their work, are necessarily often new; and it is not to be expected that they will be readily understood and accepted by the uneducated rural population.

3. At the close of the year 1876-77 various proposals were before Government of the character indicated in the above remarks. Orders have since been passed for forest settlements to be made in the Murree and Kahuta

tahsils of the Ráwalpindi district, and of the Salt Range rakhs of Jhelum and Shahpur. In the Jhelum Division, the Hazára Forest Rules have been revised, but are still pending some amendments suggested by the Government of India. A plan has been arranged for working the Kaghán forests, and a working plan has also been undertaken for Dungagalli. In the Fuel Reserve Central Division great progress is reported. A scheme has been prepared in Lahore for the settlement and reservation of seven forest blocks; in Montgomery, the survey and working plan of a large extent of reserved forests are nearly complete; in Mooltan two out of the three tahsils containing forest land have been dealt with; in Muzaffargarh the orders of Government have been passed since the close of the financial year, sanctioning the selection of a group of Government rakhs; in Dera Gházi Khan a like selection has been made and similarly approved. In the Chenab and Ravi Divisions there has been some advance in the demarcation of the Chamba forests. On the Beas the Inspector-General, the Conservator, and the Deputy Conservator made a tour in the forests of Kulu, Seoraj, and Rupi, and drew up a joint report on the demarcation of reserves, which is now in the hands of the Financial Commissioner. Proposals were also submitted for dealing with the forests of the Kangra tahsil. Lastly, the Sutlej working plan, which was received some time ago and has since been the subject of correspondence with the Government of India, has recently been sanctioned, and, in connection with the requirements of this plan, the Bassahir forest lease has been revised.

4. Successfully to carry out these and other like undertakings, it is of course indispensable that an adequate staff should be secured. Representations were accordingly submitted to the Government of India in the summer of 1877 regarding the strength of the superior staff, and the whole of the subordinate establishment was thoroughly revised last autumn. The knowledge and capacity of the forest staff have however a greater importance than its numerical sufficiency, and the Lieutenant-Governor would invite the Conservator's further attention to the desirability of training natives of the country in practical forestry. The suggestion in the 66th paragraph of the Report, that some supernumeraries might be placed in the Plantation Division to learn their work, commends itself to His Honor's judgment, and he would wish to know whether this plan can be carried out. The Government of India was addressed last May on the subject of the establishment in India of one or more schools of practical forestry; but pending action on the proposals then offered, which must, of course, take time, there is no reason why the most should not be made of the educational resources already available. Both in the interests of the many candidates for Government employment, and looking to the economical working of the department which has always a sufficient demand for really trained men, it seems very desirable to attract to the Forest Department, young natives who have physical qualifications and an inclination for forest work.

5. The Conservator deals in the 2nd section of his report with the subject of protection and offences. This question is by no means free from difficulty, especially in the present state of the law, and it has received much attention in connection with the Forest Bill. On the present occasion the Lieutenant-Governor is not prepared to issue any detailed instructions, though it may be noted that the ruling of the Chief Court referred to in the Conservator's 46th paragraph has been met by a section of the Bill which substantially provides that forest offences which are also crimes, can, if necessary, be punished as such. At the same time His Honor entirely approves the orders issued by the Conservator that trifling cases of petty stealing, if such it can be called, are not to be prosecuted in Jhelum and Ráwalpindi until much better arrangements have been made for reserving forests. With reference to Mr. Powell's conclusion that Magistrates do not adequately distinguish between the more excusable forest offences and those for which there is no pretext, it may be admitted that until the Forest Bill is passed the line is not easy to draw; but in instituting prosecutions, officers should look to the intention of the offender, and consider whether the act alleged is a mere abuse resembling a civil injury, or whether by reasons of real dishonesty or wilful mischief, it amounts to a crime; moreover, where under forest rules, specific offences have been provided

with what has been deliberately considered to be sufficient penalties, it would seem opposed to the spirit of reasonable legislation to impose other penalties from the general Penal Code, for the sole reason that they are more severe. His Honor thinks it monstrous that respectable people should be prosecuted as thieves, and brought on the criminal registers as bad characters, because they have committed trivial offences against forest conservancy; and whilst fully admitting that forest restrictions are necessary, he would wish them to be worked in this spirit. With regard to the fires of 1876 in the Ráwalpindi district, of which the Conservator states that no notice was taken, he should submit a separate report. The Lieutenant-Governor is gratified to observe in the present report that instances of embezzlement and dishonesty on the part of forest subordinates are far less conspicuous than in the previous year. By taking security from the employés, the Conservator has very properly dealt with the temptation to which they are exposed.

6. The Sutlej River Officer notices the singular freedom from trouble experienced in the transit of timber along the territory of independent Chiefs, who allowed the free examination of logs caught on their shores, and at once gave up any that belonged to Government. His Honor cordially acknowledges the courtesy and good—will of these Chiefs in the matter, especially in the case of the Raja of Biláspur and the Rana of Bhajji, and the Commissioner of Umballa will be addressed accordingly.

7. In regard to forest improvements there is not much to notice, the principal work being, as above explained, the settlement of areas and formation of working plans. The reboisement of the Pabbi hills has been undertaken, and a scheme has been sanctioned for the improvement of rakh Baoli Lehna Singh, the object in both these cases being the supply of fuel for the Punjab Northern (State) Railway. Another thousand acres has been added to the 2nd circle of the Changa Manga plantation; but this is not yet in yield, the cuttings being merely such as are necessary for proper thinning.

8. The arrangement of the information on the subject of experiments under one sub-head is convenient, and should be followed in future years. It appears that Chinese blackwood is growing well at Changa Manga, but failed at Baklo and Chitrík; experiments in edible chestnuts were unsatisfactory, some 5,500 nuts distributed to different localities yielding only 374 plants. No fresh experiment was made in *Eucalyptus*, but the trees of this species at Changa Manga continue healthy. *Tún* has also succeeded well in the Plantation Division.

From reports received from all divisions during the past year, it would seem highly probable that the fruit-bearing olive can be successfully cultivated in the dry districts of the Ráwalpindi Division, and should the Conservator find himself able to institute any plantation experiment with this tree on a sufficiently large scale, the Lieutenant-Governor would be very glad if it were undertaken.

9. With reference to his paragraph 140, the Conservator can report separately on the road down the Chenab passing through Kashmir territory. If this road is required solely for forest purposes and would be of no use to the public, there does not appear to be any *primâ facie* reason why the Kashmir State should be called on to clear it although if the clearance is indispensable to the work of the division, it might be arranged for it to be carried out at the cost of the department.

10. Adverting to paragraph 153 of the report, inquiry has been made about the supply of firewood to the Murree Municipality.

11. The statistics of the demand for fuel from the Fuel Reserve Central Division given in paragraph 175 are interesting, and should be kept up from year to year.

12. In commenting on the financial results of the year, the Conservator objects to the too liberal grant of forest produce, without payment, to other departments of Government. It cannot be admitted to be a matter of much public or imperial importance how such transactions, which are merely the utilization of Government property by transfer from one set of Government officers to another, are shown in the accounts. At the same time, departments can

justly claim a record of the aid they afford to others in order that no important result of their labours may be forgotten. The question is provided for by special rules, and is only noticed here in order to point out that one of the chief functions of the Forest department is to co-operate with other departments, and that, in the discharge of this function, there should never be hesitation merely because the method of account is unsettled or departmentally regarded as unsound.

13. The revenue of the year amounted to Rs. 5,98,754, and the expenditure to Rs. 5,22,483; leaving a surplus, exclusive of the value of stock, of Rs. 76,271; but the surplus including stock is Rs. 1,71,136, somewhat in excess of the surplus of 1875-76, which was Rs. 1,52,058. The revenue shows a decrease of about three lakhs, and the expenditure of Rs. 31,743. The decrease is sufficiently explained, the chief cause being the circumstance that only some three lakhs' worth of wood was sold as against nearly six lakhs' worth in the previous year, when the Beas Division realized at once more than two lakhs of rupees by the Rajputana (State) Railway unexpectedly taking over a large stock of sleepers ready cut from former years. It is also stated that there were considerable sales which were not concluded in time to bring the cash results into the accounts of the year, especially on the Sutlej ; whilst the timber operations of the Jhelum Division, where the largest expenditure was incurred, will not produce their full effect till the fellings reach depôt during the course of 1877 and 1878. As represented by the Conservator, the most satisfactory point is that the expenditure under timber heads has been kept down, having decreased from Rs. 2,08,552 in 1874, to Rs. 1,41,631 in 1876; whilst the depôt receipts have not fallen by any means in proportion, being in 1876, 6,51,899 cubic feet, and in 1874, 7,87,375 cubic feet of timber.

14. The subject of district and canal arboriculture is conveniently dealt with in an appendix. The results shown are on the whole good, and the districts of Hazára, Ráwalpindi, Jhang, Hoshiárpur, and Sirsa, may be mentioned as amongst those where the most intelligent attention is bestowed on the matter. The efforts of Mr. Coldstream, the Deputy Commissioner of Hoshiárpur, and the interest taken in the promotion of arboriculture by Colonel Davies, the Commissioner of the Delhi Division, are acknowledged by the Lieutenant-Governor. The remarks of Mr. Wakefield as to the tendency of the rainless tract to expand so as to threaten part of the Hissar Division with the danger of being brought within the drought circle, seem to merit attention, and His Honor would be glad to be favoured with the Conservator's opinion on the subject.

ORDERED.—That this review be printed and published in the *Punjab Government Gazette*. Also that copies be furnished to the Secretary to the Government of India, Department of Revenue, Agriculture and Commerce, the Conservator of Forests and the Financial Commissioner.

By order of the Hon'ble the Lieutenant-Governor,

LEPEL GRIFFIN,

Officiating Secretary to Government, Punjab.

Printedt a the Governme nt Civil Secretariat Press, Lahore.—29-1-78.—4300

FOREST ADMINISTRATION REPORT 1876-7.

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CHAPTER I.—SUMMARY OF ADMINISTRATION.

Settlement of Forests.

At present our chief desideratum is to get the forests 'settled.' It has been found that in most of the formerly constituted forests, and notably in the Rukhs, practices have grown up which it is difficult to alter; and in many cases the recorded declarations of right have to be interpreted with such large deductions, that a settlement which will enable this Department really to control and keep in order the forests under its charge, is necessary. This done, it is *essential* that all reserves should be gazetted so that there may be no doubt about the assertion of the Government right. It is also desired to complete the area necessary to be maintained as forest, as soon as possible, generally, because the longer this is deferred the more difficult the acquisition becomes, and specially, because of the evils threatening hill districts from forest denudation—a subject the recognition of which is quite a recent feature in our history.

Methods of managing this Province.

2. To carry out these objects, a sufficient staff is needed. On the other hand, it is no doubt easier to work this Province with a very small staff, devoting the establishment to realizing material for sale, opening all the Rukhs to grazing and so getting the largest return possible. Establishment charges are thus minimized and the income raised. At the same time, as officers are busy delivering fuel, cutting trees and rolling logs down the bare hill side, they have no time to plant or to close tracts for reproduction, hence they do not come in contact with the "rights" of the people; and things go very smoothly. But this system (no doubt a popular one) can only be carried on by touching the capital, and jeopardizing the future.

I have therefore, at the risk of being blamed, refused to follow this method of work.

Summary of Divisional administration.

3. I shall briefly recapitulate the measures taken in each Division.

Jhelum Division.

The Hazárá rules and schedules were revised, and proposals for preserving the district forests (in the hills) submitted. These, even if sanctioned, cannot be carried into practice unless an officer is devoted to the work.

At the same time, a plan was arranged for 3 years' working of the Kaghán forests, comprizing the felling of 6,000 trees or as near that number as could be managed.

This plan is being carried out; meanwhile the other rivers are not being worked, with such small exceptions as will be noted.

5. I have further initiated a working plan for the Dungagalli forests. This is now in progress under Mr. Vincent. The system of selling standing trees, which formerly led to so much waste, has been stopped, and the depôt system introduced without refusing, *ad interim*, trees urgently wanted for Public works. The working plan will comprise three working circles, and is made on the basis recommended in Dr. Schlich's paper read at the conference of 1875.

Rawalpindi.

6. On my way to Hazárá, and on returning, I visited this Division and drew up a scheme for settling the forests in the plains. No orders have yet issued on this subject, which is to be regretted, as the demand for fuel is enormous, and the supply (as far as Government rukhs are concerned) will soon come to a dead stop. A loud outcry will be raised, and a demand will be made to open the Khanpúr rukhs; this I am determined at all hazards to refuse, till the area of these rukhs has been properly divided into blocks and estimated for: and this is being done as fast as the means at disposal will allow.

7. The hill forests in this district will soon cease to exist, although at present nominally over 1,00,000 acres in extent. I proposed measures for these, but no orders have been issued; and when it is recollected that this is now the second season that clearing for cultivation is allowed without the smallest check, that a mere formal free permit (everywhere disregarded) for cutting is required, and that an *exparte* ruling has been issued by the Chief Court, to the effect that no prosecution can take place for stealing trees or forest produce, the result will be easily imagined. The survey will be spoken of hereafter.

I only trust that when a very great difficulty comes to be felt, it will be remembered that I have not ceased to represent the matter.

Fuel Reserve North.

8. I have also made a final representation about the state of the Salt Range Rukhs, in which the rights of Government are practically nominal. I believe that it has been decided to mark off a number of rukhs which may really be protected from trespass and grazing. This will then settle the Ranges, Jhelum, Salt Range, Pind Dadan Khan and Khushab. The rukhs of Gujrat and Bhera appear to be settled, only demarcation is required; also those in the plains of Jhelum, to some extent.

Fuel Reserve Central.

9. Great progress has here been made; requiring only final orders to be issued.

In *Lahore*, a scheme has been submitted for settlement and reservation of 7 forest blocks.

In *Montgomery*, the survey and plan of working a large extent of reserved forest is nearly complete.

In *Multan*, 2 out of the 3 tahsils containing forest land, have been dealt with. Proposals, regarding the Serai Sidhu forests, are before the Financial Commissioner. A preliminary report on those in Mailsi has been submitted, on approval of which, a final survey and report will be made. Lodhrán tahsil remains to be examined.

In *Muzuffargarh*, pursuant to a Land Revenue Settlement, a group of real Government rukhs has been agreed to, but orders are not yet passed.

In *Dera Ghazi Khan*, a similar selection has been made, but though submitted long ago for orders, none have yet issued.

As it is not to be expected that there will be any demand at present for fuel from the rukhs of Mozuffarghar and Dera Gházi Khan, it is hoped to keep them all closed till a very satisfactory growth is obtained.

In *Gujránwalla*, nothing can be settled till Mr. Wild's former work has been recovered and submitted to consideration.

10. In all these cases, the "reserves" will, it is hoped, become *real* Government forests, either (in most cases) completely free of rights, or only with definite rights. All the other rukhs will be given up. This will of course show a *very large decrease* in the Revenue of the Forest Department, and as that is a consideration more thought of than anything else, I have urged the importance of crediting at least to a "Forest" head of account, all revenue in wood or grass or minor produce, as the *only* way in which the demand for revenue can be complied with. The rukhs that are not protected must pay for those that are: in other words, the Government should be content to spend money at present in protecting the *reserves* deriving its credit from the resources of the *open* rukhs.

Plantation.

11. Calls for no remark.—Steady extension has been going on, but the Division has been miserably crippled for want of supervision, and even now, only one European Forest Ranger is available to help in this work, which would afford a good school of training for at least 3 Subordinate Officers.

The great feature has been the success which 'rukh cultivation' has met with under Mr. Minniken, of which this is not the place to speak further.

Chenab Division and Ravi (Chamba Forests).

12. I regretted to find that some indiscriminate fellings had again been opened in these forests, although it was my earnest endeavour to secure the demarcation of the forest and a preliminary plan of working before any felling was allowed. In the Chenab indeed only dead trees and windfalls have been cut, as was desired.

The demarcation was carried out with great zeal; I can particularly speak of Mr. Mackay's work which I have just seen part of. But this work, excellent as it has been, requires trained supervision, and I am glad to say that, during the year, Mr. Pengelly was deputed. So thorough has been Mr. Mackay's work, (and I believe Mr. Forrest's also will

be found to be commendable) that only a simplification of boundaries and a combining of scattered reserves into groups will be needed—but the area is enormous, and the erection of pillars will take some considerable time.

The paucity of Establishment compelled me to place Mr. Pengelly in charge of the Division, and I regret to state that he has not yet been free to commence any actual demarcation work. He *must* be relieved of charge of the Division and devoted to the special work. I expect that, supposing him to be at work in the season of 1878, he will complete the whole by 1880, or in three seasons.

The fellings alluded to (one in Duîr forest (Ravi) just visited, being about the most ill-considered thing of the kind I have ever seen) unfortunately necessitate time and money in clearing out the timber.

Beas.

13. During the year, a small timber contract was in progress under Mr. Healy whose honest conscientious work is more like that of a responsible Officer than of a Contractor who requires to be looked after daily. I only wish we could have more men of this kind at work in our forests. In the autumn, the Inspector General, Conservator, and Deputy Conservator, made a tour in the forests of Kulú, Seoráj and Rupí, and drew up a joint report on the demarcation of reserves, which has been since submitted. I have also submitted a proposal for dealing with the forests of Kangrá Tahsíl which awaits orders.

Sutlej.

14. I have nothing special to record, beyond that a revised lease, (which I beg to bring to notice, *I had nothing to do with*) was submitted to Government. I have used my best endeavours to get the draft altered so as to prevent the loss to Government which I anticipate, and the matter is still unsettled. It is much to be regretted that orders have not yet been issued on the working plan. It would seem that the fellings done in 1876 were, in some sort, intended to follow the plan, but nothing else has been done, except the exploration and survey of certain streams on the right bank, two of which have now been completed. Valuable as this latter work is, I am of opinion that, with our diminutive Establishment there are many more important things to be done first.

15. The Kalesar Sál forest still remains unsettled. The land to be allotted to Dhalíp Singh is not determined (vide Annual Report 1874, para: 66) and meanwhile a question of right has arisen with the Jagirdárs, who receive 9 shares out of 20 of the proceeds of Kalesar, they being co-proprietors with Government. This has been referred to the Financial Commissioner. I beg to express a hope, that either a Settlement Officer may be definitely deputed this cold weather for the final settlement of this long pending affair, or else that it be ordered to stand over till settlement, which I believe will take place two years hence.

16. It is to be feared that this summary is not showy or productive of large cash revenues; but I am convinced that it will pay well in the end; the sooner our plantations are finished the sooner they will pay; the sooner we have real power over a limited area of rukhs and see them improving, the sooner will they pay when the present unprotected resources are exhausted. To economize *now*, by refusing proper establishments, is simply to secure that the Government tracts will *not* be found in order when the day comes that they should have the rule of the market.

17. In the meantime, economy must be practiced, but that is to be done, not by cutting down the Staff, but by omitting to spend large sums on fuel contracts and timber works, which while they absorb the attention of the Staff and render it impossible for them to attend to the collection of data for really ascertaining our yield-powers and the proper demarcation and settlement of our forests, produce large *returns*, but only an insignificant *profit* over the expenditure.

II.—AREA AND BOUNDARIES OF RESERVED FORESTS.

Jhelum Division. (*Hazárá District.*)

Location of Civil Stations.

18. In Hazárá ;—The location of the stations Thandiani and Nathvagalli was reported on with a view to the determination of the boundaries, but no orders have yet been passed.

The demarcation of the Dungagalli forest with permanent numbered pillars entered on the map is much to be desired, and this must be next taken in hand.

Demarcation on Kághán.

19. The Kaghán and Sirán Ranges are also in the same condition, but the settlement catchá pillars are kept in order.

In Khánpur

20. The Khánpur Range has had the pillars made permanent ; but no record of boundaries has yet been drawn up, nor have the pillars been numbered or entered on the map. Mr Sparling's attention will be drawn to this.

RAWALPINDI.

Changes in area

21. The only change in the area that can be reported is that the Civil authorities made over to the Local Officer a rukh (1,141 acres) called Kaulial. As no intimation was made to me of this, I cannot explain it. It is allowed to be strictly reserved, but is in itself a very poor piece of ravine cut land with a few phuláhí bushes. It has been demarcated, partly, as it represented a piece of waste land taken from the village by the Settlement officer, but is not worth spending money on. The arrangements for the rukhs are in abeyance though reported more than a year ago, waiting for orders.

Revision of boundaries.

22. The boundaries of the rukhs in the plains which will be left to us, supposing the orders to be carried out, are being revised by aid of a patwári of the district staff. He has been doing important work in determining correctly the boundaries of the Syadpur Margulla rukh (on the range of hills of that name) and when the whole is complete and attested by the Deputy Commissioner, pillars will be erected.

23. Another important rukh Kherimár, has been the scene of two considerable boundary disputes ; one, I learn is settled and the boundary firmly indicated by 7 Masonry pillars. Another, relating to the land made over by certain land owners of village Drek, is unsettled.

Survey of Hill Forests.

24. As to the Hill forests of Murree and Kahuta, Mr. Elliott has heard that possibly maps of Murree may be ready in September 1878, and of Kahúta tahsíl, not for 2 years. Meanwhile, he adds, as I have also observed, " the forests are fast disappearing under the combined attacks of fire, axe, and plough."

FUEL RESERVE DIVISION NORTH.

(Districts Jhelum, Shahpur and Gujrat).

Demarcation of Rukhs

25. It would appear that, except a few rukhs in Gujrat, demarcation is very imperfect ; equally so in Bhera (Shahpur). It is proposed to carry out gradually a demarcation chiefly by interrupted trenches, trees being grown on the bank thrown up wherever they will grow.

The Salt Range

26. The state of the Salt Range rukhs has been reported on, and it is believed that the settlement officer will take up the subject of re-demarcation this cold weather. How this can be done if Mr. Moir has to go to Ajmere, does not appear.

Bhimbar torrent

27. Mr. Moir made an excursion to the sources of the celebrated Bhimbar torrent, but as these sources are in Kashmír, no protection can be afforded to the perimeter of the catchment basin, and Mr. Moir says that unless this is done, the torrent which already costs so many thousands of rupees in destruction, may yet increase to a considerable extent.

Chenab Division.

Selection of Reserves in Pangi.

28. The selection of Reserves so far completed, awaits a final inspection and approval by Mr. Pengelly—also one large range Tindi, remains to be treated.

Ravi Division.

Selection of Reserves in Ravi.

29. Remarks in the same spirit apply. In all the river basins, reserves have been marked off but in many cases they are very small, separate, and often consist of patches of deodár only. It is necessary to consolidate these tracts into workable blocks. From what I saw this season, having visited the whole of the Siûl basin demarcations, the work had been so far exceedingly well done, and the consolidation discussed on the spot with Mr. Pengelly will not be difficult. It will not be possible to make all the tracts reserved free of rights, but we shall be able to prevent clearing for cultivation, regulate all rights exercised and recorded under the rules, and close strictly those portions that need it.

Absurdity of proposal for working Ravi.

30. Nothing struck Mr. Pengelly and me more strongly than the absolute absurdity of proposing to work the forests with one Assistant for the whole area, and merely a Forest Ranger on the river.—It could be done only on the principle of the old Ravi timber agency; which was to send up an officer just like a contractor, to cut trees.

Beas Division.

31. As regards Kúlú nothing can be said on this subject, as the year under report was one in which proposals were drawn up.

32. In Kangra, some very slight changes were made, giving up small pieces of land for local convenience as for a burning place, as a spring was in the immediate neighbourhood.

Difficulty in Kangra, in giving opinion on plots cleared for tea cultivation.

The question of settling the forests in the Kangra Táhsíl is before Government; meanwhile these forests are comparatively out of danger, except that this Department has the peculiarly odious duty of reporting on certain tabulated proposals to clear small blocks for tea cultivation. Even if it were possible, which it is not, that an experienced officer should be available to inspect each, he would be liable to err. The proper plan is to set off the areas which *may* be given up, and then let the valuation &c., proceed as at present which would be a mere matter of arithmetic.

In Hamírpur, the statement shows a certain small area of forest as reserved, but no final demarcation, as yet been made, and is still awaiting orders.

Nowshera island plantation.

33. The Nowshera island on the Beas, partly planted, lost 40 acres 31 poles by erosion, but apparently not planted land, at least the report does not say so.

Sutlej Division.

Kalesar.

34. Kalesar has been incidentally alluded to. In Basahir, 19 forests are reported as demarcated with small boards affixed to trees. This is in connection no doubt with the working plan proposals, but until the plan is sanctioned, and the lease question settled, I must consider the work in this river in abeyance.

I beg that it will be borne in mind that in general I had little opportunity of directing beforehand what work was to be done in 1876, having only returned in April of that year, and being obliged at once to go to Kághán and Hazárá.

Fuel Reserve Division Central.

Demarcation of Reserved rukhs.

35. The only actual demarcation work done has been in Multan and Montgomery. It seems undesirable to notice the works till completed and sanctioned.

I do not consider changes made by handing over rukhs to the Plantation Division for treatment, to be changes of area, such as those which actually alter the extent of Forest estates under our control.

75 acres were taken from Rukh Ráwal-jhangar Dublé, Dhig, and Bhagyána for a rájbaha" from the Bari Doab Canal.

It also seems needless to detail a series of petty changes, when as yet no fixed area has been sanctioned as reserved forest.

Plantation Division.

Increase in area.

36. This Division took for plantation 1,389 acres of Rukh Baoli Lehna Singh, 500 in Kot Lakpat (the Western part) and 300 of rukh Chichra in Gujranwalla, for cultivation or " Rukh improvement." Also 1,000 acres were added to the Maujoki Circle at Changa Manga.

The diminutions represent 50 acres at Kothala given back to owners, as the experimental plot is no longer required there : the trees grown are utilized by being given for Railway line planting and some to the Fuel Reserve Division North.

By erosion we lost in the Jhôk group, of Sailaba, 10 acres planted, and 70 acres not planted. In the Jugian group 150 acres planted and 79 not planted. Against this 25 acres were gained by alluvion at Jhôk.

Restoration of pillars.

37. At Changa Manga various pillars were renewed, and at certain points adjoining cultivation, substantial masonry pillars (additional) were put up. It is hoped that these have been duly entered on the Register and on the maps.

Repairs to the pillars injured by the heavy inundation of 1875, were made in the Sailaba at Jhôk. 25 masonry pillars were added to the old settlement ones.

At Ludhiana five, and at Philor six new pillars were erected.

38. The area of Reserved forest is shown in table 45. Where the opening columns differ from the closing columns in last year's corresponding statement, it is to be understood that the new figures are the more correct—consequent on survey or more exact estimates; alterations noted (in the columns for the purpose) are confined to actual gain and loss of area by alluvion, and diluvion, grant &c., not by correction of errors in past returns.

SECTION 2.

(*a.*) PROTECTION AND OFFENCES.

Jhelum Division.

39. *Establishment.*—From what I saw of this Division, there are some excellent men here, but Mr. Sparling has certainly an exceptional faculty for handling native establishments. Abdul Rahoem, the Forester at Dungagalli, has been promoted to Forest Ranger. It was found necessary to dismiss one forester and to reduce another ; 3 guards were also dismissed for neglect or misconduct.

Security for subordinates.

All Subordinates to Rs. 15/- are reported to have given security ; but it is not quite certain that this has been understood ; by security is meant security in money or property realizable, not merely bonds for good behaviour.

40. *Offences.* It is unfortunate that the careful report of this Division has mixed up offences with *cases of cutting by permit.* The return is concerned only with offences committed in forests under our charge, that is reserved forests ; and should only be classified as in the statement 48. When it is desired to give additional information it is quite right to add a supplementary Form.

Very trivial sentences and want of discrimination between grave and excusable forest offences

41. It certainly does appear to me that forest offences are encouraged by the extremely trivial sentences, as Mr. Sparling remarks :—There were 3 cases of the most serious offence, removing boundary pillars, but unless the report is wrong, only trifling fines were inflicted. 26 persons were concerned with encroaching by cultivation on boundaries, and the same result followed. As the reserves are clearly demarcated, this offence ought certainly to be repressed, as there is not the excuse which can be made, when a man's cattle get into a reserve or when he cuts a tree for his pressing wants.

42. It is reported that the granting of grazing rights inside the reserves, works very badly. Although the blocks subject to such rights are defined, still it is impossible to prevent trespass, and great damage is reported in Kághán and other places. There seems to be a want of cattle pounds, also; this at least might be remedied. The damage done by passage of flocks in Kaghán also might find its remedy, and it will be necessary to resort to fencing, at some expense.

Blocks subject to rights inside the reserves.

43. The offences on the river are chiefly stealing pieces of small wood, and cutting up or chipping away Government logs temporarily stranded. Logs are also stolen, concealed in manure heaps and cut up, the defence being that the log was sold in sites by the Kashmír traders. In cases of this kind adequate punishment should be awarded.

River offences.

44. A review of the cases certainly leads to the conclusion that the Magistrates do not adequately distinguish by their sentences, those offences which are more excusable, and those like illicit cultivation, moving boundary marks, stealing and concealing logs, for which there is no pretext.

Conclusion on the subject.

RAWALPINDI.

45. *Establishment.* In this Division all employés down to Rs. 8/ have given security, men on Rs. 10/ of Rs. 250/- and on 8/- of Rs. 100/- each.

It is an excellent plan followed in this Division to attach a guard who can write to every forester, so that there is always some one at the local head-quarters. Two guards had to be dismissed for misconduct.

46. *Offences.* The *exparte* ruling of the Chief Court, has of course introduced great confusion in spite of the fact that, a printed slip was inserted into the report, which explained away part of the evil.

Exparte ruling in a reference.

I do not know what steps to adopt, till I receive orders, as it would seem that no appeal lies from one of these 'review' cases. It was a case of clear theft of logs of trees to the value of about 200 rupees. The statement of the law and facts on which the review was obtained, was grossly incorrect, but as in such cases no one appears for the Crown, the statement could not be questioned.

47. Of course therefore the number of acquittals is large, but I am satisfied that frivolous or unproved cases are not brought up. This district is also distinguished for the delay in hearing cases, so that in some instances the important circumstantial proof of freshly cut stumps, and freshly turned up ground disappears by effect of time or weather. A case of this kind (illicit clearing for cultivation) was instituted in April 1876, and was finally settled in March 1877—of course ending in a discharge.

Its results.

48. I can only say that the administration of justice in this district, in the matter of forest offences is unfair to this Department, exhibiting plainly a determination to prevent forest offences being prosecuted at all, and if prosecuted to prevent any result.

General objection.

49. Fires as usual were quite unrepressed. No notice whatever had been taken of the hot weather fires of 1876, up to the date of the Divisional report, (June 1877) a table of the fires reported with their estimated extent (which can only be estimated) here follows. It should not escape the notice of Government that this is the only district in the province where these fires regularly occur and that the sole reason for the unenviable distinction is that the Magistrates do not choose to stop it. The people are well aware that the District authorities are opposed to all forest management and feel secure accordingly.

Forest fires.

STATEMENT of Fires in Murree and Kahúta Ranges during the months of May, June and July 1876.

Forests or Rukh.	Range.	Total area.	Burnt.	Remarks.
		Acres.		
Nawal-Khad (Dewal)	Murree ...	3,958	400 Sqr. ft. ...	
Chak Naunathal ...	Do. ...	17,200	2 Kanáls ...	
Naukot Jandála ...	Do. ...	12,934	1 Mirla ...	2 Chíl & 1 Khair trees burnt.
Kajliban ...	Kahúta ...	15,984	2½ Kanáls ...	44 Chíl & 1 Kako „ burnt.
Nawal-Jhelum ...	Murree ...	5,827	About 10 Square miles ...	Great damage to young trees.
Khad-Kuthián ...		5,362		
Patriálá Morat ...		9,814		
Juntrawalla ...	Kahúta ...	11,775	2 Kanáls ...	Damage to 80 chíl trees.
Do. ...	Do. ...	11,775	25 Gumaon ...	Nearly 1,000 young chíl trees burnt.
Naráí Tellatár ...	Do. ...	51,293	1½ Sqr. miles ...	
Naukot Jandála ...	Murree ...	12,934	10 Sqr. miles ...	Burnt in '75 also.
Kakrand ...	Kahúta ...	10,424	Firing in cultivated land ...	Leaves of some trees burnt which were near fields.
Narai Tellatár ...	Do. ...	51,293	Do. ...	Do.
Do. ...	Do. ...	51,293	1 Gumaon ...	
Do. ...	Do. ...	51,293	12 Gumaon ...	
Phughár; out of Rukh but near Rukh Kajliban ...	Do. ...	51,923	2 Kanál in cultivated land ...	No damage to trees.
Kajliban ...	Do. ...	15,984	10 Gumaon ...	Great damage to young trees.
Do. ...	Do. ...	15,984	5 Sqr. miles ...	Great damage to young trees.
Do. ...	Do. ...	15,984		
Kachal ...	Do. ...	2,815	About 1½ Sqr. mile	Great damage to forest.
Naunathal ...	Murree ...	17,200	About 5 Gumaon	Do. do.
Naráí Tehlátár ...	Kahúta ...	51,293	10 Gumaon ...	Do. do.

Chenab.

50. *Establishment.* A forest guard was convicted of embezzlement of a small sum of Government money and sentenced to a fine of Rs. 25/- : he was of course dismissed.

Robbery by a forest-guard.

During the winter, a forest-guard broke open a box in which a small sum of money was deposited (in Pangi) for payment of the Establishment. He has since been tried and sentenced by the Chamba State.

Security for Subordinates.

51. Security has been taken from all employés according to the rule, except two or three, who have been called on to furnish it.

I have recently directed security to be taken from persons drawing Rs. 10/- as well as 15/- probably this order was not received before the close of the official year.

Fuel Reserve North.

52. *Establishment.* Is very insufficient; a revised scale however will shortly be submitted. The very imperfect control exercised by the officer lately in charge, made matters worse. The subject mentioned in para : 62 of last report, turns out not so bad as the officer in charge supposed. Mr. Moir has ascertained (as his predecessor ought to have done) that the men *were* really at their posts.

It is quite impossible however to do justice to this Division with one officer, and I have obtained, since the close of the year, another.

It was found that many old and useless guards were on the same beats for years; Mr. Moir has transferred the whole establishment, with good effect.

Forest Ranger dismissed.

53. The Forest Ranger (European) was dismissed for gross misconduct and failure in his accounts; the deficit was recovered however.

Several guards had to be dismissed for misconduct—and one Forester, after having appealed to me, and a full enquiry taking place, was dismissed for holding back pay sent to him to disburse to the guards, and making frivolous excuses in explanation.

Security.

54. All employés down to Rs. 15/- have given security but two, and 25 of the guards have also voluntarily given it.

The writing of the Service books had been neglected, and is now being gradually completed.

54. *Offences.* The table of prosecutions will show that a large number of persons tried were convicted, proving that frivolous complaints are not brought up.

Order issued as to prosecutions.

55. I have expressly ordered here (and in Pindi) that trifling cases of petty stealing are not to be prosecuted, until much better arrangements are made for reserving forests. The Deputy Commissioner of Jhelum has recently taken up the unfortunate review case at Pindi and applied it to Jhelum. As this ruling cannot possibly be applied except to the case of Pindi, I have directed that special prosecutions be instituted, so that I may at once appeal against the decision, and get the point settled.

Cattle pounded.

56. As many as 4,487 cattle were pounded, and fines levied to the extent of Rs. 792/12/0. It must be remembered, as will be detailed in due course, there are *some* authorized closed rukhs in this Division so that trespass is inexcusable. The excellent feed of grass and "malla patr" obtained by grazing in a closed rukh is well worth the absurd fine levied at the pound, under the present law, and the wonder is that pounding is not more frequent.

Ravi.

57. *Establishment.* Mr. Pengelly notes this as totally inadequate; certainly as regards European supervision another officer is a *sine qua non.*

One forest guard was dismissed during the year.

All employés have given security, but some have since been promoted, so that the security originally deposited bears no fixed proportion to their present pay. This point will be referred specially.

Beas.

58. The scale of Establishment is ineffective; this report is in fact general—I hope the whole will be remedied to some extent before the next report.

No dismissals occurred during the year.

All subordinates, including most of the guards on Rs. 5/-, have given security.

Fires.

59. *Offences.* One fire in Kangra is stated to have caused some damage and 5 others none.

In Hushiarpur, about 150 acres of the Karnpur bamboo forest were injured; the fire was extinguished by aid of the villagers; its origin is unknown.

A fire occurred in Seorâj, which destroyed a number of young *Chil* trees.

Theft of wire fencing.

60. The practice of cutting and stealing wire fencing has been complained of; fortunately this year the perpetrators were caught and punished.

Sutlej.

Assistance rendered by Chiefs whose territories border on the Sutlej.

62. *Establishment.*—No remarks are made. The River officer notices the singular freedom from trouble experienced in the transit of timber along the territory of Independent Chiefs; they allowed the free examination of logs caught on their shores, and at once gave up any that was Government timber. The Divisional Officer suggests that acknowledgement should be made to these Chiefs of their courtesy and good will in the matter. *

Burning of the village Rarang

63. No offences are reported. The village of Rárang was burnt in the autumn, and exaggerated reports having been sent in, a general permission to cut down the forest was accorded by the Deputy Commissioner. The results are given in the following report :—

* The Raja of Bilaspúr and the Rana of Bhajji are specially mentioned.

"In November 1876, the village was burnt. Colonel Batchelor knowing that the men would require timber to rebuild the village, waited a long time for them at Nachar to come and get their permit. As they did not turn up, he started for the plains. Subsequently when at Philor, a Rarung man came to Colonel Batchelor and asked for a permit to cut 5,000 trees. He said that the reason why this application had not been made before was that they had fully intended to desert the old site and build a new village somewhere else. I hear they applied to the Rajah, but were refused. In March, a permit for 2,000 *Kail* trees was sent to Jemadar Nickah with orders for him to go and mark the trees to be felled. This did not reach Nickah until the 27th April, when he was at Sangla up the Baspa valley. * * * * * He reached Rarang on the 8th May, and found that the people had commenced cutting on the 25th April, that is to say *two days before the permit reached Nickah*, and had already cut 1,263 *deodar* trees and saplings. He very properly put a stop to all fellings, and reported the matter to me. Colonel Moore happened at the time to be passing and he, on the representation of the villagers, wrote to the Deputy Commissioner Simla, to the effect that the Rarang people had been prohibited from felling timber by the Forest Department. A Parwana was then issued from the Deputy Commissioner to Jemadars Boota and Nickah ordering them to give trees to the villagers "be-kimat" "be-tawakif," and that they were to send their answer to the Court.

I myself reached Rarang on the 27th June, and immediately saw that the order to stop felling had not been obeyed. The whole ground round the village was covered with beams and saplings. The place looked exactly like a sales Depôt, and the villagers were still dragging more saplings &c., out of the Forest ;—that I stopped immediately, and told the men that they must first use up the timber lying about the village, and then after that if any more was required they would be allowed to bring what they had already cut out of the jungle, but that in no case would any more Deodar be felled. In the Deputy Commissioner's letter to you it was stated that 60 houses had been burnt, but by the villagers own showing only 33 were burnt. The mistake most likely occurred by counting the Dagis (sweeper caste) houses. These all escaped.

I have estimated that it takes three 1st class trees and 100 saplings to build a large size house. Taking this as an average for all the houses, we have the maximum number of trees required—100 1st class and 3,300 saplings would re-build the whole village. The actual number felled is as follows :—

1st class	430
2nd "	716
3rd "	1,913
Total,	3,059

I have placed a chaprassi in charge now and until the walls of the houses are built up and ready for the roofing, no first class timber will go out of the forest, and even then only 100 trees out of the 430 felled will be given.

The first thing that struck me on entering the forest was the comparatively few fresh cut stools to be seen, and it was only in looking up that I found out the reason the trees had been felled at heights varying from 6′ to 15′ from the ground. The village I learnt was burnt once before and this same jungle indented upon for timber. Then as now the villagers had felled their timber high up, and the consequence is that the under branches which were left have shot upwards and have formed as it were 6 or 7 young trees growing out of the same stock. It is a mixed forest of *Pinus Gerardiana* and Deodar in the proportion of about three *Gerardiana* to one Deodar."

Fuel Reserve Central.

Establishment and offences.

64. Mr. Browne has been alone in endeavouring to work 4 large districts, besides the supervision of the Multan Sub-Division under Mr. Ellis.

A guard (Keera Singh) was convicted of bribery and sentenced to six month's imprisonment, another also of Multán was convicted of taking a present to screen an offender ; both were of course dismissed.

Fines on Establishment.

65. A number of fines were inflicted for neglect of duty. The Deputy Conservator's attention is invited to the fact that except in rare cases, this form of punishment is objectionable ; it only tempts the men, already poorly paid, to recoup themselves dishonestly ; if a man after being taken to task for neglect, will not work, it is better to remove him.

Security has been given by all subordinates ; 4 guards were dismissed—two in Lahore, two in Multan.

65. *Offences.*—A few fires occurred (8 in all) but all of small extent and no damage done. In one case only one person was sent for trial and fined (in Dera Ghazi Khan.)

PLANTATIONS.

66. *Establishment.*—It is a pity that some supernumeraries cannot be placed in this Division to learn. Occasional demands are made upon me to send out trained men, and as our establishment is so small, it is only with great difficulty we can spare any one. A native so trained was supplied to the Kapurthalla State during the year.

Case at Changa Manga.

67. *Offences.*—The Establishment has worked well but owing to the fact that no permanent European supervision was available for Changa Manga, the Establishment began to misbehave ; a forester was accordingly prosecuted for conniving with a contractor, and convicted, also the contractor himself, who it was found had stolen wood, and also had employed the Government "beldars" to work on his own land. Some guards also that were implicated were fined and transferred.

Cattle pounded.

68. 944 head of cattle were pounded during the year. 2 fires occurred in grass land near the Jhôk block (Lahore Sailaba) supposed to have been caused by the cultivators burning the old coarse grass. As this threatened the plantation, the Magistrate caused the parties to enter recognizances for good behaviour.

Right of way granted.

69. A public right of way has been granted through the plot of land known as Thatta Fakir-ulla, on the Chenâb.

Protection of Changa Manga for Railway's fire.

70. To protect the Railway border of Changa Manga besides the 40 feet road always kept clear, an additional 10 feet has been cleared of grass.

SECTION 2 (B) IMPROVEMENT OF FORESTS.

JHELUM DIVISION.

Island plantations on Jhelum.

71. The two belas, Pira Ghaib and Seila, have been placed in charge of the River Officer, partly as he is just as well able to look after them, as the Fuel Reserve North Officer, who had too much to do, and partly that he may not loose all interest in Forest work, by being continually employed on mere timber work.

Steps to secure their not producing malaria.

72. It being represented that the belahs were getting malarious, and that this was dangerous so close to Jhelum, it has been determined to divide the whole into compartments, by cleared roads taking the opportunity of estimating carefully the amount of material on the roads cleared, which will serve as sample patches. The detail of this work will be reported next year.

Dungagalli Range W. Plan.

73. *Dungagalli.* Mr. Vincent was deputed rather late in the season to commence a preliminary working plan for the Dungagalli Range, where there is a heavy demand for timber and firewood. The short time that remained only enabled him to reconnoitre the forests and he had to take most of the Jhelum Office work while Mr. Sparling was away in Kaghán.

Nurseries.

74. There are now nurseries established at Kuja galli, one acre above and half an acre below. It is not said that proper entries have been made in the official note book. A large nursery should also be opened near the Forest house at Changlagalli.

The distinction between nurseries, seedbeds and plantations does not seem to be understood. It was arranged, for instance, that the nursery on the *top* of the hill at Changlagalli should be abandoned—as too high ; at the same time it was desired that the whole of the hill should be planted out (and left) with *P. Excelsa*, a little *A. Webbiana* in the higher portions and deciduous trees : all these being furnished from a nursery near the house.

As for Kujagalli nursery, this must be looked on not as a *plantation*, but as a nursery chiefly for raising *deodar*, to be put out in favorable places. This year it was stocked, the upper nursery, with *A. Webbiana*, *Acer cæsium*, and walnuts (which failed mostly) the lower with Deodar, *Excelsa*, and *Webbiana*, the Deodar not having been successful.

The raising of *P. Excelsa*, which bears transplanting admirably, to be largely attended to in replanting the old *Webbiana* tracts. The Jhelum Officer's attention is particularly requested to these remarks.

75. We visited the Málkandi hill 'Plantation' in Kaghán where, in former years, a

Málkandi Plantation.

plantation had been made, and found that owing to the public road passing it and flocks of goats getting in, proper results had been prevented; neverthless some growth remains of promising deodár. This place can moreover easily be managed. The road was to be diverted, a fence of rough stone wall to be erected, and a mixture of Deodár and *P. Excelsa* used. The trees to be put out close together in *lines*, the lines 20 feet apart. The lower part of the slope is to be cultivated with *Dráwa* (Cedrela Serrata). A large nursery for this hill will be required. I have promised the Ranger in charge a reward of Rs. 100 whenever this lower slope is stocked. The extreme upper part of the hill will stock itself from the natural forest, but a stone fence is a *sine qua non.*

Reward promised.

76. *Khánpur.* Experimental attempts to grow Deodár in the higher parts have been made: at time of last visit there were 50 plants on Túngh hill, 3,700 feet, the same on Makhingal (5,000) and some on the Chajjian and Sirihang hills, about 5,000 feet.

Deodar in Khánpur forest.

Rawalpindi.

77. Natural reproduction in the higher forests would be good if cattle were excluded. The great rukhs of Narai and Jantra, burnt in 1872, are entirely void of seedlings, and mature pines year after year succumb to the injuries then received.

In the plains 3 rukhs allowed to be closed, have had nurseries made, *viz*: Khairi Múrat Káwágarh, and Kherimár. The nurseries are intended to supply trees to be planted out. Thorn fences have been found to fail and in 2 nurseries deep trenches, with "phulahi" sown on the bank, have been adopted.

Improvements of some of the plains rukhs.

It is impossible to expect much reproduction with so little control, but *Dodonæa viscosa* reproduces well, coppices, and ousts the phuláhi. In part of Khalachitta however phulahi is said to be reproducing well.

The effect of closing Khairimurat is already remarkable. Olive has made 4 feet shoots in two years, and phulahi shoots of 2-3 feet. On a bare spur on the south (hot and exposed) side, 6,000 holes (one foot deep) were made and filled partly with 1 year's phuláhi plants from nursery in March 1877 and partly with seed. These are doing well.

The nurseries in this rukh now 27 acres in extent are fairly successful, and about 280 bamboo plants have struck. The sowing of *Dodonæa* abundantly in belts and squares should be largely practised.

Kheramar and Kawagarh are not yet entirely closed, but goats and camels are excluded. Repressive measures against cutting the olive shoots have also been allowed. The 5 nursery beds in Kawagurh (4½ acres) succeed with phuláhi, other species failed.

In Kherimar ⅔ acre nurseries are recent, and the 'ber' sown is only germinating.

Chenab.

78. The forests here are capable of natural reproduction, and as the time has been occupied in drawing up a record of rights, and making demarcations, this may be said to be the first step in protection.

Improvement in Pangí.

79. Mr. Forrest has offered remarks on what was said last year about Bamal plantation, and I am glad to see that he agrees; no blame was attached to him. He speaks of the difficulty in supervision as the Division must be left before 15th October, and sowing should be in November. But Bamal hill will be treated by a partial clearing of the coppice in lines about 5-8 feet broad according to the height of the coppice (chiefly *Corylus*) the lines being 25 feet apart. A nursery should be laid out ready for seed the last thing before leaving, and surely an intelligent native can be trusted to deposit the seed in the lines, only just covering it with sprinkled earth and chopped moss. The seedlings after 2nd year would be transplanted into the lines, close together, say one foot apart, not more:—this must of course be supervised by the Officer himself.

Suggestions as to procedure.

Fuel Reserve North.

80. Protection cannot here be fully carried out till a settlement is made, in Jhelum and in the whole Salt Range. Captain Wace does not, I am glad to see, support the opinion which I remarked on in para. 45 of last year's Report, and considers that Government *has* a right to close rukhs.

Protection at present impossible.

Annual cultivation.

A great nuisance has been the so-called annual cultivation leases. As is so often the case, these written papers mean nothing and the same people having got them year after year, consider they *own* the land. I have distinctly directed Mr. Moir to refuse to issue any such leases, and to refer every claimant to the Deputy Commissioner :—

Working of Rules of 1873 for allowing free material for domestic purposes.

81. The general rules of 1873, applied primarily to the Khushâb rukhs, and a list of villages has been made, and tested and found correct. It is hoped that these rules will cease to be necessary on a proper settlement of the rukhs taking place.

Mr. Moir refers to the Government Review (para. 18) of last year's report. It is not easy indeed to understand how the Bherá Tahsíl is affected and perhaps it should be "Khushâb" (where the real difficulty arose) for the Bherá people are well off, having more wood in their Shamilát than they know what to do with. At the same time these rules apply to *all* rukhs where the necessity is shown to arise.

Rights in Gujrat.

82. In Gujrat there are no *rights* but the newly discovered right of Dewán Thakur Dass, to half the income of three Chenab belas, Kotli Gohán, Syán, and Kanlowál.

Restoration of barren rukhs.

83. For reproductive purposes we have had permission to close a barren ravined, sandy rukh called Gurát (in Jhelum District) where the ground is chiefly dry burnt, reddish or grayish-yellow, friable clay, yielding a coarse loam, and which the rain cuts up into fantastic shapes. Ridges of half formed sand-stone intervene. This has been closed since 1871-72, but doubtfully with success as to *actual* exclusion of cattle. The Plantation note book was found *blank* in the office, consequently previous experiments have been wasted. This much however is learned of this rukh, and similar ones :

Results of experience.

(*a*) that any attempt to cultivate with watering by Bhisties is an expensive failure.

(*b*) that of 500 transplants of Shísham put out in 1874, 200 still live, but look sickly ; it seems that the whole soil must be improved before Shísham will succeed, except a few in shady and exceptionally favorable places.—

(*c*) that sowings with Sanatta *D. viscosa* are the chief things to be done, also phulahi, Lahúra (*Tecoma undulata*). Sanatta coppices well and quickly and is an excellent fuel wood.

(*d*) Mr. Moir rightly observes that advantage has to be taken of every tuft and bush as a shelter behind which to put a young plant, but he is hardly aware of the character of Kíkar in the Punjab. Its sowing should be persisted in also "bér" (Jackals eat these berries unless soaked in Kerosin). It is better to sow Kíkar seed passed through goats ; but it always will succeed sparsely ; and wherever large areas of Kíkar have been sown, and made to come up *en masse* by irrigation, they have died down by frost, in the north Punjab. Kíkar will not do well at all as far north as Ráwalpindi.

(*e*) Complete rest and closing under the worst circumstances of soil, do wonders. Mr. Elliott will please note these remarks.

Commencement of the Pabbi Reboisement.

84. The first attempts this year were made also to reboise the Pabbi hills ; more has been done in 1877, and I trust that in 1878 we may have a regular treatment.

I directed that a number of small plots near the line of railway should be sown, and enclosed with low walls merely piled up ; Mr. Hillier however entrusted the work to the Forest Ranger who was dismissed, and consequently the work was more costly than I intended. Still, 254½ chains of solidly constructed wall have been made, though not as well placed as might be. Already a great change has taken place, from simply excluding cattle.

I have since improved this plan by enclosing the whole of a strip of ½—¾ mile broad on each side of the Railway line. In this all vegetation is being encouraged, sowings of all sorts of rough species made, ravines and irregularities levelled, and all rain water utilized by "barrages" or dams. This year's work, 1876, was only a commencement.

Rukhs closed.

85. The following arrangements to close rukhs for reproduction have been made. It is necessary to exclude camels and goats first, so as to make the closing gradual ; all closings are effected in consultation with the Deputy Commissioner.

Jhelum.—Rukh Garát (nominally closed since 1871.)

Lehri	...	Against goats and camels.
Sakar	...	
Mánki	...	
Jindi	...	
Samail wáli ban	...	

Gujrát.—Sheep, camels and goats have been excluded *nominally* from all rukhs (excepting the rest of the great Pabbi rukh and Rasúl) and the following are quite closed :—

Dhúl and Mári.
Bhachhar.
Part of Pabbi.

(Mr. Moir, does not say anything of Behlolpur (*vide* last report para. 80) nor of Vasú and Sohána said to be closed.)

Shahpúr.—(Bhéra) Bahowál.
Bhallowál.
Pakkowál.
Vairowál.

„ (Khusháb) Kírí.

The following rukhs are closed against camels and goats :—

Jhelum.—Northern half of rukh Nili.
Rukh Tilla.
„ Paréra.
„ Dringan.

Shahpúr. „ Augá.
„ Mardwál.
„ Makráni.

The great difficulty is to get the closing actually carried out, and to prevent our establishment letting in cattle for a consideration. It has however been notified that guards and foresters will be held responsible on recent traces of cattle appearing in closed rukhs.

Cutting of "Malla" put a stop to.

85. It is satisfactory to learn that no "*Malla*" (*Zizyphus nummularia*), an important agent in restoring the rukhs, was cut in Jhelum or Shahpúr. In Gujrat the leases were sold without any notice being taken of the conditions, or of the letter which called attention to them. It was found necessary to allow the cutting for this year, except in rukhs Dhúl and Mári (rukhs valuable as available for Railway) Pabbi and Bhachhar ; for these I preferred to pay Rs. 580/- compensation.

This is perhaps not a normal instance of the selling of leases, but I have no reason to think that the compulsory taking away of the right of selling from the Forest Officer has had any good effect whatever.

Thinning in the Shisham Islands.

86. Thinning and pruning is reported in all the islands of the Chenáb, and in part of the great islands at Jhelum, before transfer. I wish however to say that *pruning* is a highly dangerous business, and had much better be left alone, unless a *competent European* Officer sees it done *himself*.

Ravi.

Improvements in Ravi forests.

87. Little can be said on this head at present. Demarcation is in progress, but we are dealing with forests that have long been illused by contractors; and what will be required, is a course of intelligent treatment based on thorough examination. The cutting out of dead and dying trees, clearing out inferior species which oppress the better, undertaking the first works for conversion of forest overgrown with bad species back into Deodar (as in the fine forest area near Rikhaud or in Chadbent,* where there might be a fine little block of almost pure ash forest), these works *must* be done if we are to act as curators of the forest not as lumbermen.

The villagers will gladly take the inferior pieces and trees unfit for export, and our market supply must be met by sawing up locally the masses of timber still in the remote

* Both in the Suil basin.

nullahs, where no power can float them out.* We must compensate for such of these logs as have been admitted to belong to certain owners before the lease.

Fencing of Dhauri.

88. The forest of Dhauri has been fenced with excellent results in the spread of natural seedlings on the border of the forest; a plot of ground above the road in continuation of the same forest, has been planted out, and was visited by me recently: it may be regarded as fairly well stocked all over.† This does not coincide with Mr. Allan's report quoted in para. 70 of last year's report, but perhaps Mr. Allan had not seen the plantation, as I have.

And Jang-banni.

89. In the same way Jang-banni forest, consisting of a few trees only, was enclosed with 4 acres adjacent in 1873, and is now covered with young growth from 18" to 3' high.

New lessons learnt in demarcating Deodár localities.

90. This shows how essential it is in dealing with a country where Deodár forests have been unfairly denuded (as throughout Chumba) that we should demarcate, not merely the little isolated patches of deodár that have escaped; but that we should extend the area by waste land and inferior forest contiguous till we have got sufficient manageable blocks, which by fencing and perhaps a little sowing and planting in aid of nature, will be re-converted into deodar forests. Civil Officers who cannot of course understand this, must not take umbrage at the process, but must take it on trust till in a few years the results become manifest. I confess this is a thing I have had to learn, being quite ignorant of it when we commenced demarcation work in 1871.

Bassu plantation.

91. The Bassu plantation is said to be now fairly stocked, 4,580 transplants being put out in August 1876, to supply the place of the plants injured by fire (apparently) in 1875.

Kálátop.

92. In Kálátop *it is said* that 23,380 plants were put out under head of replenishing, in the compartments prescribed by the working plan.

Baklo reserves.

93. Baklo reserves have since been visited: they had been subjected to very unintelligent treatment. The nurseries are especially foolish. Originally it was directed that as the demand for fuel would soon be pressing, every effort was to be made to grow *Eucalyptus*, the *Grewia* of the neighbourhood, and *Acacia stipulata* in nurseries. The trees were then to be planted out all over the forest. This was done, but the nurseries were so ill protected that about 2 Eucalyptus (I think *marginata*) remain, also one or two nibbled *grewias &c.* The nurseries were then replenished with Chil (!) and *left*, so that now the beds are useless, unless we dig up the Chil and clear the ground. A number of "Oi." (*A stipulata*) which should have been put low down on the slopes of Chalúma and sheltered, were put high up on the windy slope of Bára, and have been regularly killed by the frost, although they are pushing out shoots again, showing the suitableness of the plant if properly treated.

A quantity of China blackwood, a species that promises well, sown in June 1876, has all died out, from neglect. There is however only one guard (who cannot write) in charge of all these blocks.

* Since received A *melanoxylon*.

It will be necessary to construct at once now a good nursery bed (with a new Establishment) and here the Australian Wattles soon expected,* both from Government and from a private source will be sown,—but here also I hope for more China blackwood; *Acacia stipulata* should again be sown, and lots of *Grewia*. Sanatta sowings must be tried in squares (not in nurseries) in the forest, and quite low down.

Natural reproduction.

It is the one satisfactory feature of these reserves that natural reproduction in Bára is excellent and the appearance of the forest quite changed since I last saw it: a few deodár survive on the top; but were badly planted.

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* We have asked some of the traders why they cut in such places: they said that they trusted to an accident blocking up the valley, in which case the tiny stream would gradually accumulate its waters and on the barrier bursting, logs and all would come down with a rush.

† It is very remarkable that the plants were put out in little pits dug to receive them, and instead of being filled up, the plants were put at the bottom; nevertheless, they have succeeded, and the shelter thus afforded seems to have been in this well-drained soil, actually beneficial. Had the soil been stiff clay, nine-tenths of the plants must have been killed by the pits filling with water.

THE following list of Expenditure on experimental plantations is given for further enquiry.

Division.	Name of Plantation.	On 1st April, 1876.				During 1876.				On 31st March, 1877.				Remarks.
		Area.	Total Cost.			Area added.	Cost.			Total Area.	Total Cost.			
		Acres.				Acres.				Acres.				
Ravi ...	Bassu * ...	146	3,076	15	10	...	...	...	...	146	3,076	15	10	Of this Rs. 22-1-3 spent during the year in planting 4,580 young deodárs to fill up blanks caused by fire in 1875.
Do. ...	Dhauri * ...	25	106	0	0	...	...	...	...	25	106	0	0	
Do. ...	Barmor (Forest house) ...	Not known.	76	8	0	...	...	...	...	Not known.	76	8	0	
Do. ...	Siúra (near Barmor) ...	Do.	195	12	11	...	...	...	...	Do.	195	12	11	
Do. ...	Jang Banni ...	Do.	364	3	6	...	...	...	...	Do.	364	3	6	
Do. ...	Chanota ...	Do.	1,087	6	4	...	...	...	...	Do.	1,087	6	4	Planting in *forest* only; not true plantation.
Do. ...	Barnota (Sagti) ...	Do.	305	14	11	...	...	...	...	Do.	305	14	11	Do. do.
Do. ...	Chitrari ...	Do.	13	11	0	...	...	...	...	Do.	13	11	0	Seed beds in forest.
Do. ...	Bara Banso ...	Do.	26	6	6	...	...	...	...	Do.	26	6	6	Do. do.
Do. ...	Pheran ...	Do.	496	8	8	...	...	...	...	Do.	496	8	8	Do. do.
Do. ...	Siwali and Duib near Ulans ...	Do.	29	11	0	...	...	...	...	Do.	29	11	0	Spent on clearing and preparing ground for sowing seed; but not actually sown.
Do. ...	Locality not mentioned in Cash Book...	Do.	1,077	8	0	...	...	...	...	Do.	1,077	8	0	Locality mentioned in vouchers, but no vouchers in this Office. Further enquiry will be made.

Those marked * are existing and completed plantations.

BEAS.

96. The demarcation requirements have already been incidentally alluded to. I may notice, however, that though there is a good system here of supplying the wants of the country, the very large demand renders the reservation of tracts on a large scale desirable. The yield tables show an estimated amount of 800,000 cubic feet of wood found for local use chiefly. This cannot go on long, if forests are to be reserved in little patches only.

Fences.

97. *Kúlú.* The fences of the Dana biál, Sial biál and Manálghan, Dungri and Dudlú reserves were repaired.

It is not necessary here to enter into details as to the various deodar experiments, as the Joint Report on Kúlu describes them.

Results of Deodar planting,

98. The work of the year, however, must be noticed. In November and December, nearly the whole of the unstocked portions of Dungri, Dána bial about half of Siál biál and part of Dudlú were planted out in lines 15 feet apart, the plants being one foot apart in the lines. More than 75 per cent. of these have failed. Some 12,000 plants put out in the rains in Siál biál, have fared even worse. It is remarked, however, that 1875 seedlings put out in 1876 rains, fared better than the same kind when put out in the winter, while 2 years transplants did better in winter than in rains planting.

Remarks on this.

99. I am doubtful whether this planting was done under European supervision. My experience is that natives will *not* take proper care. They neither regard the roots in removing from the nursery (carefully cutting clean any broken root with a sharp knife), nor do they attend to putting plants at the right depth: (usually they bury them too deep), and above all, they will not press down the earth thoroughly; (from want of judgment as to the depth to hold the plant and the amount to fill in) the consequence of this is that the roots get oversoaked in the loose earth, during the rains, and frost attacks them in winter.

In future, it will be desirable regularly to depute a Plantation officer to this work, so soon as the work closes in the plains after 15th July or 1st August.

The absolute value of this "row-planting" is however shown by the fact, that later accounts prove that the lines are sufficiently stocked in spite of the percentage of failures; thus we have—per length of 100 feet:

Danabfúl	... ...	65 plants.
Do.	(Rains planting)	6 "
Siál-bial	... ...	32 "
Dudlú	... ...	34 "
Dungri	(on old slide)	46 "
Do.	(old fields)	50 "

Improvements in Kangra District

100. In *Hamírpur.* The forests are protected with success from the danger of fire carried by passengers on public roads, by keeping the road swept clear of dry needles. The same is reported in Lohara forest (Hushiarpur.)

What is meant by nurseries

101. In *Dera,* sowings have been made in various forests; as they are intended to remain *in situ* they should not be called nurseries.

A nursery means a permanent or temporary, but well kept, garden, partly of seed-beds and partly of beds in which young plants are put out to strengthen; the whole being destined to be ultimately planted out in the forest, not to be left where they are.

Many officers seem to have the idea that little plots, like those at Bakloh, sown or planted and *left*, are nurseries, which is not the case.

The following is Col. Stenhouse's description of the sowings in the Dera forests (Kangra District.)

Kherian.

(a). "In the Kherian reserve on the road between Dera and Hurripur in the Dera Tahsil, Jaman has been sown in square patches in some abandoned fields taken into the reserve at demarcation. Some Tun and Sal were also sown there and Sissu lower down. The Jaman and Tun have come up well, and the Sal though not likely to succeed were healthy looking when I saw them in March. The Sissu I did not see. The Kherian sowings and all the nurseries and sowings in Dera have taken place in blank patches included in the reserves demarcation. The Kherian reserve is a miscellaneous jungle.

Jamoli.

(b). The Jamoli reserve is situated in a very hilly part of the Dera Tahsil called the Changar Taluka about 15 miles north east of Dera. This forest is composed of Chil with a sprinkling of miscellaneous trees. Four or five acres of old fields have been sown broad cast with Chil seed. The plants have come up in large numbers but a large part of the land has been broken up by a landslip and the whole seems rather too moist for Chil. The natural reproduction of this reserve is very good.

Malian.

(c). The Malian reserve is also situated in the Changar Taluk and like Jamoli can only be reached on foot. About 18 acres of fields were taken into this reserve at demarcation and have been mostly sown with Chil which has succeeded remarkably well in most places. Some of the plants are two feet high though the seed was only sown in August 1875. There is a Sissu and Ohi Nursery in this reserve.

Samlian.

(d). The Samlian Forest reserve is not far from the Beas near where the Dera and Nurpur Tahsils of the Kangra District meet the Hoshiarpur District. It is a miscellaneous forest on high and broken ground. Chil was sown in some fields there in August 1875, but was mostly destroyed by peafowl, white ants and pigs. The ground is dry and stony. Sissu was also sown and has done pretty well but the bamboo and Jaman sowings look sickly, the ground being too dry.

Balwal.

(e). Balwal is a small reserve of 20 acres about 10 miles below Dera on the Sola Singi range. Here Tun was sown in some fields in August 1875, in a narrow ravine. The seed germinated freely and the plants are healthy and from 1 to 2½ feet high. Sal and Jaman were also sown but don't look so well.

Behan.

(f). There are some sowings I think in the Behan reserve which complete the list of sowings in the Dera and Hamirpur Sub-division. I have not seen the last mentioned.

Those in the Nurpur forests are thus described ;

Bhali.

(g). " In the Nurpur Tahsil going along the road from Kangra to Kotla, you come first to the Chil sowings in the Bhali reserve five or six miles on this side of Kotla. About 2 acres of terraced fields were sown in 1875, but they are scantily stocked and the plants are unhealthy. The soil is a stiff clayey loam. The average height of the plants is only about 9 inches.

Tatal.

(h). Besides the Chitril nursery which is permanent there were Sissu, Siris, and Khair transplants in the Tatal reserve but they have nearly all died, and the Jaman look very sickly. The ground brought under cultivation is low and probably swampy in the rains.

Jhakar.

(i). There was also some sowing or planting work done in Jhakar reserve which is on a continuation of the Chitril ridge, but I have not seen it nor heard the result.

Bindraban.

(j). The next you come to on the road to Nurpur is the Bindraban reserve. Here Chil has been sown in about 4 acres on a blank patch of undulating ground formerly cultivated. The plants are about a foot high and sufficient to stock the ground if they all get on. Chil seems to succeed better on well drained ground than on terraced fields.

Dhumtal Bamboo forest.

(k). The Dhumtal bamboo forest, 623 acres in extent in the Nurpur Tahsil, is situated about 3 miles from Pathankote on the left bank of the Chukki near where it flows through an artificial cutting made by the Irrigation Department. It is on the whole well stocked with bamboos. Here some bamboo of a kind received from the Central Provinces was sown and 7,000 were afterwards transplanted amongst the indigenous bamboo which however is said to be far stronger than the imported kind. The stock of bamboo is not even all over the Dhumtal forest, but dense in some places and rather sparse in others. What is mentioned above is all I believe that has been done to increase the quantity of bamboo in this forest. The growth of bamboo from seed is slow, but I have requested Mr. Wallace to try the mode of raising bamboos used by the Malays, that is, to cut holes between the joints of a green bamboo, bury it in a trench with the holes uppermost and then irrigate the trench. Each joint it is said will, under this treatment, send up a vigorous shoot. If done in the rains it may be unnecessary to irrigate artificially.

And those in Hoshiarpur as follows :—

Karanpur and Bindraban Bamboos' forests.

(l). The Karanpur forest 3,804 acres and Bindraban 2,529 acres are situated near Pandain in the Hoshiarpur District. They are well stocked with bamboo, particularly Karanpur, which is pretty evenly stocked throughout; whereas Bindraban is sparsely clad in some places. Half of Karanpur and two thirds of Bindraban are closed throughout the year, and the whole of these forests is closed during the months of June, July and August. The zemindars of certain villages get bamboos for their own use at cost price from these forests. Chowdri Jai Karan holds a cultivating lease for the term of settlement of 275 acres in Karanpur and 78 acres in Bindraban.

There are several small patches sown with bamboos in Karanpur and Bindraban. In two

patches which I saw the seed had germinated plentifully. Bamboo seedlings have also been transplanted in places, but these operations have not yet been carried on in a systematic manner.

Bamboo transplants in Lohara.

(*m*). In Lohara a number of low spots on the banks of nullahs have been planted with bamboo, but the plants are gradually disappearing, the locality being evidently unsuited to them.

Sowings in Lohara.

(*n*). In other parts of Lohara there are sowings of various kinds and in a great many different places. Most of them can be seen on the way from Purwain to Amb by making a circuit for the purpose. The order in which I visited them was as follows:—

1. Those near Chalair-ka-sid sown in 1869-70. The sowings cover about an acre and a half. The plants are about 4 feet high, healthy and vigorous, spreading out and covering the ground well where sufficiently close together.

2. Another spot behind Chalair-ka-sid about half an acre was sown by Mr. Rossiter in the rains of 1874 and is fairly stocked.

Baherá and Amultás sowings.

3. Further down the road you come to Baherá and Amultás sowings in a fenced enclosure about 2 acres in extent. The Baherá was sown in lines between ridges in the rains of 1875. The Baherá plants have succeeded fairly but the Amultás has failed almost entirely.

Chil sowings 7 years old.

4. There are three other patches in Chalair all sown with Chil seven years ago at the same time as No. 1. The average height of the plants seen in one of these patches is 2 or 3 feet. The Chil trees round about this site are stunted. The growth of the trees in the neighbourhood affords a pretty sure indication of the quality of the soil.

Sowings of 1874.

5. Chil sowings in Mathari Tika Kohi sown in 1874 about 4 acres average height about a foot fairly stocked.

Sowings of 1874.

6. Chil sowings in Mandholi of the rains of 1874, covering about 4 acres, plants 1 to 2 feet high, the most successful of that year.

Sowings of 1875.

7. Chil sowings of 1875 in a flat field between 2 small ridges. A good many have died and the rest look unhealthy, the ground being probably too moist in the rains.

Sowings of 1875.

8. Chil sowings of 1875 in Baler about 5 acres ; part well stocked, the rest not so sown on terraced fields.

The best of the 1875 sowings.

9. This piece, called Chalkara, sown with Chil, is the best of the 1875 sowings ; ground thickly stocked and the plants about 2 feet high in the best part. The site is the terraced top of a ridge where water does not lodge and soil is light loam.

Sowings in Mathari.

10. Four more pieces in Mathari on land near a stream and one on high ground. The three pieces seen are rather scantily stocked. They aggregate about 4 acres in extent.

Sowings in Salohi.

11. Chil sowings of 1875 in Salohi on old fields about three acres in extent scantily stocked and plants poor in appearance.

Sowings in Ban Bakshi.

(*o*). In a part of Ban Bakshi called Salon a few miles east of Parwain, Sissu, Tun and Jaman were sown in 1873. The Tun and Jaman nearly all failed but the Sissu covers about 1½ acres. It is however very small for its age, being only 2 or 3 feet high. The largest plant is 5 feet 6 inches high and about 2 inches in girth. There are a few other patches in Lohara sown with Chil which I have not seen.

Nawshera.

103. In this Division is included the Nawshera island plantation, consisting of two plots, one near the village of Mullawal suffers much from the river erosion. In this way 40 acres 31 poles were lost in 1876. The age is about 8 years to 10, and the trees are from 6"—24" in girth and 30'—40" high *(D. Sissu.)*

Forest Gardens.

104. At Monáli we have established a "Forest garden." It is 2 acres in extent and may be increased. It will partly serve as a site for Deodar nurseries and seed beds and partly for a place where experiments (in an European or Alpine Climate) can be tried.

I hope to establish *one* other garden in Kúlú, but at a lower elevation, so as to have the best means of testing the growth of Eucalyptus, Chestnuts and other valuable species. Deodar seed of the year was scarce and bad. The work of the garden will principally be found under head of "Experiments."

105. The Chitril nursery is intended to be permanent. It was a very scrambling, untidy place when I saw it in November, and there were then a few Eucalyptus (which I have a fruit and leaf of) and some Chinese blackwood, looking very well. These have all since died, I hope not from any neglect. If from frost, it is very important to ascertain, but the trees have not died of frost at Changa Manga.

Chitril Nursery.

'Khair' *(A catechu)* does well here, and should be encouraged. Jaman should not be cultivated. Tun should be persistently cultivated, and only transplanted out into shady dells: also 'Kakkar' *Pistacia integerima.*

This nursery which lies at about 4,000 feet and is rather dry, should be neatly laid out, and the road to it repaired. A house is being built here for the Forest Ranger. I have separately addressed Colonel Stenhouse on this subject.

From this nursery 18,560 plants were put out in the neighbouring forests in July, only some survived. The forest is hot and dry, and it should be attempted at first to stock only the shady and best portions with transplants, trying *Khair* on the open field, with "Oi" and *Grewia* (Dhaman.)

SUTLEJ.

106. The *Kunai* forest has been partly fenced; it is said that labour was not procurable to finish the fence.

Plantation work.

There is a plantation (or nursery?) at Ronung, and a water course of a mile long has been made to it. If it is a *plantation*, an irrigated plantation of deodar, is in my opinion, a mistake—because it can only be on a small scale; if it is intended for a nursery only, that is another matter. The seeds were sown in 1 foot belts with 8 feet between, and the remark is made that when old enough they will be put out *into* the 8 feet spaces. This is evidently meant for nursery purposes.

East *Nuchar* fence is kept up, and though the heat of 1876 and late rainfall destroyed a number of sowings in bare patches (December 1875) the growth generally is satisfactory.

FUEL RESERVE, CENTRAL.

107. Mr. Browne points out as affecting the protection of rukhs, that the right of Lahore Zemindars to graze in Government rukhs at half rates, loses the revenue 10,000 rupees annually, when they can perfectly afford to pay full rates, which are light; and gives rise to abuses. As persons who are non-cultivators, get cattle grazed upon this pretence, either by feeing the guards, or getting the aid of their friends who are land-holders. This being a right conceded at settlement is beyond our control; but it will not affect it is to be hoped Reserved forests, for these will not be open to grazing as a rule; and that is all we can hope to secure. Whether ultimately, when such Reserves are "defensible" and the grazing is sold in open market, such persons will have a right to claim to come in at fixed rates, I must leave till the question arises.

Effect of rights.

108. As regards the rules of 1873, for free fuel &c. certain villages of Gujránwalla were recorded as wanting this privilege. Wood was accordingly stacked in very convenient places, and a trifling fee only (to cover cost of stacking) asked. No one has come forward to ask for any wood, showing how little want there really is, at present. But it must be most seriously looked to that these rules are not the thin end of a wedge: for if directly the Government forests are the chief or only source of fuel supply and all other supplies have been cut up and cultivated, free grants of wood are made wholesale, there will be an end for ever of our legitimate revenue to which we are looking forward, as the result of our present abstinence in closing and reserving our rukhs.

Rules of 1873.

109. It may be noted that a thorn fence put round the Kourawalla forest in Multan has stood 12 months, and will stand another 12; it cost 2 Rs. per 264 × 5 × 4 feet.

Fencing.

110. Natural reproduction by closing, in the case of 13 rukhs, is reported to be good, *viz*: in Lahore District.

Natural reproduction by closing rukhs.

Mahadevi (part)	Khaira	Dhalla
Marh	Dosial	Harsai Ghuman
Kapi	Thatti (two rukhs)	Kot Lakpat (part)
Kalpi	Shah Inayat	Bhut.

Eight blocks =16,000 acres are closed in Montgomery; it is not said in the new reserve (proposed), but I believe so.

Four forests in Multán, Vinoi N. and S., Kourawala (fenced) and Tajwana, all within the new proposed reserve of Serai Sidhú—are closed.

111. In para : 79 of last year's report I described the result of attempts to plant or sow in rukh lands in connexion with cultivating leases.

Rukh improvement in connection with cultivating leases.

This year (1876) for a further trial, the area was confined to 150 acres, (*Vide* page 23 at the bottom, Report 1876.)

50 acres in Rodeshah succeeded with transplants, and 30 in Ladeki, the rest was resumed. As however Ladeki is an outlying rukh and will not come into the reserves, (being more suitable for cultivation) this experiment is of no importance.

The 50 acres success is due to the land being *Canal* irrigated. When this is the case there is no objection to the plan being continued.

In Gujránwalla, Colonel Stenhouse introduced a plan whereby a man was given over a certain area and to plant a fourth, which being planted an equal area of blank land was made over to him.

100 acres were given out in Rukh Bajwana ; but only 4 acres were successful. Mr. Browne has however received a promise that the other 21 will soon be ready, and has given a further period of grace.

Plantation Division.

Classification of work.

112. The work is treated in groups thus :—

(*a*). Changa Manga.
(*b*). Lahore sailaba.
(*c*). Outlying plots.
(*d*). Rukh Improvements. (*i. e.* Rukhs made over for artificial treatment not merely natural or aided reproduction).

Natural growth of Mulberry.

113. At the opening, I wish to record a curious fact which Mr. Brandis called attention to in the case of the Jhelum Islands—the natural undergrowth of Mulberry. Besides extending on the Islands on Jhelum and Chenab and in the Lahore sailaba, wherever the trees touch over head so as to suppress high grass and change the nature of the herbaceous vegetation—this growth has appeared spontaneously in "open places" in Changa Manga, Ludhiana, (chiefly a *kikár* plot) and Philor. Mulberry trees are everywhere common either in the neighbourhood, or in the plantations themselves ; every one has observed what crowds of birds attack the trees when the fruit is ripe and these may have a good deal to do with the spreading of the seed, as they do not remain on the way side trees but live under cover. Whether the irrigation channels and floods on sailaba carry Mulberry seed, I am not aware, but Philor is not flooded or canal irrigated.

(*A.*) Changa Manga.

Canal work.

114. It is not necessary for me to detail the work which year after year occurs in clearing out miles of canal cut, or of the grass cutting which this year was done over 306 miles of water course.

Grants of trees.

115. It is noteworthy that we made a grant of 30,000 2 years' old plants *gratis* to land owners for planting in their own lands, also 10,000 to Kapurthala. We also supplied 200 maunds of Mulberry seed to Bahawalpur, 100 maunds Sissú to Sindh and 16 maunds of Jhund to Ajmír.

Rainfall.

116. The heavy rain enabled us to dispense to a great extent with Canal irrigation and effect some considerable saving.

Caterpillars.

117. Several compartments were attacked by caterpillars, but the rains destroyed these and the trees recovered.

Van Khara Circle.

118. It is necessary to call to mind that the 1st Circle (Van Khara) of 6,843 acres (excluding road) is now a completely peopled forest of Shisham with a slight admixture of Mulberry and other species.

Maujoki Circle.

119. The 2nd or Maujoki Circle actually began in 1872, for there were already 600 acres of Shisham ; but its regular extension as a new Circle was proposed in 1875. The detailed proposals will be found in Proceedings, January 1875, A No. 2, and the sanction in June 1875, A No. 2. A correspondence had been going on between the two dates partly as to free utilization of supposed available waste water, and partly as to possibility of cultivation when water was scanty. It was determined to commence a "Maujoki Circle" of 4,000 acres, to be cultivated with species

that would not be jeopardized, if they had to do with little or no water for considerable periods. Up to the commencement of 1876 (year under report) we had in this Circle 600 acres Shisham of 4 years' old, and 960 of Jhand 2 years' old. This was all completely stocked except a blank of 100 acres and a few small patches; these are of Kallar soil and sowings again failed; the area will be left for the present. Total 1,560 acres.

In 1876, another 1,000 acres were added and laid out with roads, compartments, &c., as usual. Trenching was arranged for at an average cost of Rs. 1-11-0 per °/₀ cubic feet. This work was commenced in March and was completed and *sown* by July 1876, as follows:—

470 acres ridges (at 10 feet apart)	... ...	464 Sissú. 6 *Tecoma undulata.* (Lahura.)
530 „ ridges (at 15 feet apart)	... ...	470 alternate lines of Sissú and mulberry. 60 bad soil left blank.
1,000		

In the new extensions 100,000 willow cuttings were put out along water courses of which 75 °/₀ succeeded.

Thinnings.

120. The thinnings comprised 31 acres in Circle Van Khara. Block I. Compartment 6, 7, 8, and 420 acres Circle Maujoki. Block I. Compartments 77-111, as per following table, which is valuable for future reference:—

No. of compartment thinned.	Area of compartment.	Age of compartment.	Average height of trees.	Average girth.	Outturn of thinnings saleable.		
					Area thinned.	No. of mds. per acre.	TOTAL.
			Feet.	Inch.			
6	70·51	6	35	28	6	25·87	155·22
7	77·50	6	35	28	13	25·87	336·34
8	151·11	6	35	28	12	25·87	310·44
77	17·00	4	20	9	17	16·00	276
78	17·00	4	20	9	17	18·00	304
79	17·00	4	20	9	17	20·00	340
80	17·00	4	20	9	17	16·00	272
81	21·00	4	20	9	21	21·05	442
82	22·00	4	20	9	22	12·36	272
83	17·00	4	20	9	17	14·00	238
84	17·00	4	20	9	17	18·00	306
85	17·00	4	20	9	17	16·00	272
86	17·00	4	20	9	17	18·00	306
87	17·00	4	20	9	17	18·00	306
99	17·00	4	20	9	10	22·80	228
100	17·00	4	20	9	17	26·82	456
101	17·00	4	20	9	17	36·88	627
102	17·00	4	20	9	17	20·12	342
103	17·00	4	20	9	17	16·76	285
104	17·00	4	20	9	17	36·88	627
105	27·00	4	20	9	27	23·22	627
106	17·00	4	20	9	17	23·47	399
107	17·00	4	20	9	17	30·17	513
108	17·00	4	20	9	17	31·53	570
109	17·00	4	20	9	17	30·17	513
110	17·00	4	20	9	17	31·53	570
111	17·00	4	20	9	17	23·47	399
				TOTAL ...	451	...	10,290

(*b.*) LAHORE SAILABA.

121. *Thinnings.* Jhok and Sadhanwáli, were thinned over 219 acres—8½ acres were clear cut, as threatened by erosion. At Shahdera 230 acres were thinned.

Sowings Mahmud-buti block. Strips of 1 foot worked to 3 inches at 10 feet apart, were sown with Sissú in 17 acres; this was a success; plants now, 1 foot high. 326 acres were treated with squares 7 feet apart, success over 300 and in 26 acres (poor soil and high) seed failed to germinate. 11,372 Sissú plants put out in low land, succeeded all but 30.

Spars and fascines are constantly constructed where necessary.

122. *Jhok and Sadhánwáli blocks.* 11 acres sown in squares were swamped. Afterwards 569 acres were sown, but suffered from frost. 300 only counted as successful.

220 acres of 1875 failure, were planted out instead of sowing, this has succeeded to 95 °/₀. 3,000 willow cuttings were established.

(*c.*) OUTLYING PLOTS.

123. *Thinnings* were confined to windfalls, of which there were several owing to storms.

At Nág, all burnt trees (Report of 1875 para. 64) were cut and sold.

State of Jagádri.

124. The small Jagádri plot has grown so well that places considered blanks are now found to be covered.

Delhi.

125. The Delhi plot has been reported on separately.

Burnt area at Nag recovered.

126. Nág which was burnt last year had all the plants cut so as to coppice, and have, with aid of a watering, produced new shoots from 8-10 feet.

All the outlying plots, Nág, Jullundur Ludhiana, Philor, and Jagádri, are flourishing, the only pity is that they are such little groves.

(*d.*) RUKH IMPROVEMENT.

Bauli Lehna Singh work.

127. As a fuller Report has specially been made, this 1876 work is a little out of date; a plot of 100 acres was selected for a trial as to what could be done with bad soil. It was enclosed with a bank to keep out the over-flow of water, and trenched at 10 feet. Sissú was sown in patches in the best parts only, and farrásh cuttings in the worse. Much of the low land suffered in the rains: but in September, 23,475 Kikar and Phulahi *transplants* were put out, of which about 50°/₀ succeeded. Well irrigation is employed in the hot season. I have since ordered from Madhopur an improved Persian-wheel apparatus of Mr. Watson's design, for trial. This will be spoken of next year. For future work, an area of 1,389 acres was selected, and a large nursery prepared with 4 lacs of farrásh (Tamarix) cuttings and 3 acres Sissú sowings. 80 °/₀ cuttings and 2 acres of nursery have done well. 500 acres were ploughed up to open the soil. A considerable extension of this work will be reported next year.

EXPERIMENTS.

128. I have thought it better to gather these together under one Sub-head, and describe the species rather than distribute the subject under the general head of "Improvements" of Divisions.

In future all receipts of seeds &c. will be recorded under this head, and the result stated.

The chief experiments have been as follows:—

129. **Chinese Blackwood.**—A species which is said to resist drought, to grow rapidly by suckers or root-shoots, so as to cover a large space. It has been tried at Changá Mangá—at Baklo, (4,500 feet) at Chitrál (4,000). It is growing well at the former, died probably from neglect at Baklo; and though seemingly flourishing in November at Chitrál, has since died. The effect of frost on this species of fuel tree *in the lower hills* has to be observed.

130. **Cork Oak.**—The various earlier experiments always resulted in the non-germination of the acorns, which had lost their vitality.

In December 1875 however, a number of plants in Wardian cases were sent out, and were consigned to the Beas Division.

The following is *verbatim* Colonel Stenhouse's account for this year's report :—

I may remark that there seems no reason why Cork Oak raised in nurseries should not be sent out in boxes (not Wardian cases) like the other oaks.

" I have the honor to report on the condition of the Cork Oak plants received from England in Wardian cases in December 1875.

2. Of the plants made over to Captain Harrison of Pálampur, twenty eight are alive and most of them look healthy. They are about a foot and a half high. The site selected for them is under the wall of a house sheltered to the north by the wall and to the east and west by trees. The soil is rich and deep.

3. Of those taken charge of by Captain Lee in Kúlú, fifty survive. Their height varies from a few inches to 2 feet. They were planted in 3 beds, 2 of which are under the shade of trees and the third exposed to the sun. There are 15 and 13 in the two shaded beds and 22 in the bed which is open to the sun. The latter are the most healthy looking and there the plants have attained the greatest height but the tallest ones have been bent down by the snow. The plants were placed at distances of a foot apart, but owing to deaths the distances are now from 1 foot to 3 feet. The spaces between the plants have been covered with dry grass to keep the ground cool. The beds have been watered occasionally. They have no artificial shade over them this year but they had last summer.

4. At Dhobi where the plants made over to the Assistant Commissioner of Kúlú were planted, only six were found. One is about two feet high. It is in a sunny spot surrounded by a basket open at the top. This is the only one that looks healthy and vigorous. Most of the other plants were put under shade and nearly all have died. Those that survive in such places are dwarfed and sickly. They have all been watered occasionally.

131. **Eucalyptus.**—We have had no experiment during the year. The seed received from the Nilgiris (Proceedings, March 1875, No. 37) was sent to Pesháwar, and the result is miserable : out of 3 about ½ lb. of *E. marginata* and 1 lb. of *E. globulus* seed, only 156 plants have been produced, the species not stated.

The history of the earlier experiments at Changá Mangá will be found in Proceedings, December 1874 A. No. 5. The trees still continue healthy, the largest being 56′ high and 29″ girth ; it is 8 year's old.

Sowing took place also at Baklo, but only 2 or 3 stems have survived ; and 4 I found living, but not doing well, at Chitrál. (Kangrá District). It may be possible to identify these ; both are the same species, and have a distinct venation of the leaves, a sort of margin or rim being observed. It is only recently that the distinction between temperate, tropical and sub-tropical species has been brought to notice, and we may safely conclude that experiments in future will be made with better chances of success.

132. **Edible Chestnuts.**—I may dispose of the Yunan Chestnut experiment by saying that no seed came up. The Spanish Chestnuts received from London have been costly. The fact is that they are sent out in far too large cases. If a few small cases, say two at a time came out, they could be distributed without opening or loss of time, to divisions direct. As I hope the sequel will show the results to be promising, I beg the attention of Government to this, and also that the Chestnuts may be sent as they were, to the N. W. Provinces (*Vide* Annual Report for 1875-76).

I say this because for Basahir (a place where the introduction is chiefly of importance) it is impossible to secure boxes of *trees* arriving. They come to Philor in the winter, but cannot be transported to the Sutlej Valley till the officer goes up in April or May, and the journey is long. Boxes of *trees* on the other hand if not too large, can easily be sent to Murree, Hazara, Beas and Ravi, and for these divisions, trees are preferable.

By a letter from the India office dated 6th January 1876, we were informed of despatch both of boxes and postal bags of Chestnuts (Italian), the variety being called " Marron de Lyon."

Three cases containing 73 lbs. and one 74, were received in February, and found in my office to have 30 per cent. spoiled.

By Parcel post, the bags had from 60-70 per cent. bad, which certainly shows, contrary to my expectation, that quantities as large as 2 lbs. packed in bags do not answer as well as those in kiln dried loam.

These were distributed to all the Hill Divisions with the following results :—

Jhelum. 500 nuts received, a few were sent to Kaghan, and to Abbottabad and

Pindi, all these failed. The rest were sown in Khanpur Range, Kaintlá forest (3,700 ft.) producing only 14 plants which are now alive, and 18" high.

Rawalpindi. 500 nuts received but a large proportion were rotten. Sown at Ghoragalli (about 4,800 ft. red clay soil.) Porcupines attacked the nuts, 8 plants only survived, being from 10"—6" high in June 1877.

Chenáb. A few only were taken to this distant valley, but had lost their vitality before the place could be reached in May.

Ravi. The Chestnuts received in March 1876 were in a bad state.

A single plant succeeded at Madhopore with Mr. Watson, at the Canal workshops; though this sub-montane locality has been found favorable for some *Eucalypti* and other timber species, the Chestnut does not seem to thrive, and requires shading from the heat,—still it lives.

15 Seeds were sown in the Baloon Cantonment (dry soil, just below Dalhousie, a little under 6,000 feet I should say,) eight plants are now about 1 foot high.

50 Seeds to be sown at Dalhousie Station. (6,500) rotted from rain.

Of 200 sent to Bakloh Cantonment (about 5,000 feet) none germinated.

The rest were sown in the Kalatop forest. Only 4 trees survive in a part of the forest which has W. exposure, an elevation of 7,300 feet, and a good soil. These are 1 foot high, and 2 only 6".

Beás. Of 50 seeds given to Mr. Ballard and sown, about 5,000 feet near Palumpúr, 8 germinated and are healthy plants about 6" high.

Of 50 seeds given to Captain Fitzgerald, sown at about 5,500 feet near Baijnath, one in seven germinated. They progressed well till the rain set in, since when they are said to have been at a stand-still, though still healthy. They have been since transplanted and are now 1 foot high.

Of 50 nuts given to Captain Harrison (Bundla Tea Estate) and sown at Palumpúr (about 3,500,) two only came up, and the plants are thriving.* At Sultanpúr in the tahsil garden (*circa* 4,500) three plants succeeded and are doing well.

Of 225 nuts put out at Chitril nursery none germinated; the same fate overtook 50 nuts sown at Dharmsala (6,500 feet).

The seed was sown at the various localities between February, end of February and the middle of March (1876.)

Sutlej. Of 494 seeds received 119 had already gone. 175 were sown with 35 success at Nachar. 100 with 16 success at Kilba, and 100 with similar success at Sholtu (Basahir). At the two former places field rats destroyed many.

Kilba which is lower, and drier than Nachar appears far the most suitable place. Colonel Batchelor thinks that neither the soil nor the elevation are concerned,—the soil especially at Kilba being poorer than at Nachar, but that too much rain is a disadvantage. Colonel Batchelor concludes that the drier zone beyond the Wanga Valley is best.

The trees had attained by 12th June 1877,—those at Nachar, 1½'—2', those at Kilba 3'. This is by far the best growth recorded, and the largest number, being 51 plants in all.

Since the above experiment, some more Chestnuts were received (in nuts) *viz*: 3 boxes of 220 lbs. each and some bags, in February 1877, and those instead of distributing, I sent nearly all to the Béas, as most certain and accessible,—there are now in the Monali Forest garden 368 plants.

At Ghoragalli where a few chesnuts of this batch were sent, 6 plants are doing well, but Porcupines attack the plant, as long as the smallest portion of the nut remains undecayed. I recommend soaking in Kerosin to be tried. I have heard this spoken of as effective.

It will be seen that of about 5,500 nuts received, about 374 plants resulted.

I only opened one box at Lahore.

Importation of English trees in Cases.

133. In the beginning of the year I made a private experiment in getting out a large number of Chestnuts (young *trees*) and at the same time, rather by way of an ornamental experiment, a number of Oaks (*Q pedunculata*) Scarlet oak, Turkey oak (*Q Cerris*) Lime (*Tilia*) Beech (common and copper) mountain ash, scarlet horse-chestnut, larch and Elm.*

* My object in getting Elm was to compare its growth with our *Ulmus Wallichiana*, and especially our undescribed small leaved Elm.—(Mann of the Beas.)

These I presented to the nurseries at (1) Ghoragalli (Rawalpindi) (2) Monali Forest garden (Kúlú) (3) Kalatop and Bakloh, and (4) Khanpur Range, Hazara. All arrived in perfect condition in India, the cost of some 1,000 trees being not much over £ 10. The only heavy cost was the carriage by Indian Rail.

I must wait till next report to say how far we have succeeded, but if so, it is obvious that this is a very cheap method of getting species for introduction.

Some *Magnolia* seed, kindly sent by MR. GAMBLE, failed to germinate at Monali.

PLANTATION DIVISION EXPERIMENTS.

134. *Eucalyptus* has already been alluded to, but the 116 species of *Anogeissus*, *Schleichera*, &c., alluded to in para. 93 of last year's report, do not succeed.

Tun. (*Cedrela toona*) succeed well, and trees over 15′ have escaped the attack of the moth *larva* that eats the pith of leading shoots in younger trees.

Carob (*Prosopis dulcis*) 400 plants were in pots last year at Changa Manga. They were put out, and 150 plants 2′—3′ in height have succeeded. There are 50 plants also in the little plot at Lahore. This little corner of hard, salt, and brick refuse land near Government house Lahore (grandiloquently called the " Lahore Carob plantation ") has one thing to recommend it—it is about as unsuited for Carob trees as ingenuity could devise ; and is therefore a good trial of skill. It has been carefully fenced, as we are determined to succeed ; and the inhabitants of Lahore have no doubt been edified by seeing a copious crop of weeds,—encouraged by us for the past 3 years, with a view of improving the soil. Also common trees have been put out so that the whole place will soon be green, and will then be gradually filled with Carob trees.

Bamboo. That from Burmah was received in bad condition, and failed everywhere.

China-blackwood. Though nipped by frost has not suffered. We have applied for more seed. All plants sown last rains are now from 9″—12″ high and healthy.

Prosopis pallida.—A small quantity (½oz.) received in June 1876, produced only 2 plants which are healthy and 2 feet high. The pod is valuable for tanning.

Platanus orientalis.—Of 9,000 cuttings put out 70 per cent have succeeded.

ROADS, BRIDGES AND OTHER WORKS.

JHELAM.

135. In the Kaghán Range, the existing road up the valley—from Kawai to Jaréd (16 miles) was cleared of debris, &c. ; a new line of 5 miles taken between Páras and Bunja, along the edge of the river, 20 feet above high water line, was laid out and is in progress.

A Forest house has been commenced, It is to be a quadrangular enclosure with one entrance for safe keeping of tools, &c.

An inspection path from Bálákot over the Masar ridge near to Shankiari (9 miles) has been completed.

The road to the Forest house and nurseries at Changlagalli is now completed, and has been continued northward to rejoin the main road.

On lower river (Jhelum).

136. The Forest house at Bagham depôt has been completed.

At the Jhelum depôt, a tramway with a projecting hoist or jetty for raising logs, has been nearly finished ; this will save a large outlay in coolies for hauling up logs. The length of the tramway laid on iron rails is 2,047 feet.

RAWALPINDI.

137. 9½ miles (costing 25 Rs. per mile) of inspection paths were made in the Khairi-múrt reserve.

A tank for water has been built at Ghoragally Forest house,—a very neat work for the cost of Rs. 99. Offices for the Munshís, &c., were also built for Rs. 397.

Chenab.

138. All roads in Pangi have been kept in repair, and the Mindla counter lever bridge repaired by replacing the centre beams which had sagged dangerously.

The bund.

139. The Lai-ka-phér bund has had all the smaller breaches repaired with stone work; but for the larger breach a moveable boom 140′ long composed of 12 logs connected by chains and staples has been substituted.

Road down the Chenáb River.

140. It is most desirable that the river officer should be enabled to leave his Division by proceeding down the river. It is unfortunate that the course of the river passes through Kashmir territory, and the road is impassable,—although a very few thousand Rupees would put it in sufficient order. It seems to me a very curious thing that the work of this Division should be hampered, the Government timber jeopardised and the officer compelled to leave at an inconvenient season by a snowy Pass, because the neighbouring State chooses to keep up an obstruction. A request sent to Kashmir on this subject was declined, the reply sent ignoring entirely everything that was asked and dealing with general matters not raised. There would be no occasion to open this road to the public, and very few would desire to go by it: but the saving in loss of timber would be great, and the officer would also be able to clear out the Kashmír timber and thus aid the authorities at the same time. I trust the attention of Government may be given to this subject.

Ravi.

141. No works were executed.

Beas.

142. A 4 miles road to the Rola forest (Seoraj) was made,—and a road to Sandhár forest (5 miles).

A Forest hut at Kunan was built for 212 Rs., and other huts and houses kept in good repair.

The small bunds of stone work on the upper Beás, designed to keep logs from stranding, have stood the floods and answered well.

The Kahnuwan Jheel bund on the Lower Beás has stood well.

The Forest hut at Chitríl nursery and forest is nearly finished.

Sutlej.

Destruction of bridge wall at Rampur.

143. A trial defence wall at the site of the intended bridge at Rampur, gave way under very heavy floods. The wall was not pitched at quite the right angle. Colonel Batchelor says that the work must be carried out under the superintendence of an European Officer. quite agree, but see no reason why this work was not so superintended.

Roads.

145. The road from Bruere (*sic*) to Sanglah up the Baspa Valley (8 miles) and bridge (100 feet span) over the Baspa under Chosu, were completed. Also a 6 mile road from Wanghtu to Gangpa (with 2 bridges) along the Wanga valley has been opened. This will be of public convenience, as flocks with pashm, borax, &c., can now come direct from Spiti to Wangtu instead of going round by Asrung.

Fuel Reserve, Central Division.

146. 13 huts of shelter costing 23 Rs. each have been put up in various forests.

Plantation.

147. General repairs were executed, and watchers' huts erected along the Railway line, so as to keep a look out against fire from trains passing.

The Forest hut at Kathala was dismantled and the material sold.

At Philor a hut of masonry was built.

At Baoli Lehna Singh, the old buildings were repaired and coolies' huts, &c., erected.

SECTION III.—YIELD AND WORKING.

148. The form appended to the Report under the Code, is not very well adapted to describe our work, and I have therefore inserted a supplementary table. The yield of the forests under our charge consists not only of trees sold or cut as stems of timber (as the statements Nos. 53, 54 would seem to imply,) but we have the following:—

(*a.*) Trees cut for logging or sawing up and export for Government market.
(*b.*) Trees sold or given for Public Works or private use to right-holders and others.
(*c.*) Firewood cut by area and sold by stacks.
(*d.*) Permits for quantities of firewood, for surkhi kilns, lime kilns and charcoal.
(*e.*) Dead and dry wood—a right to collect over defined areas usually sold by auction.
(*f.*) Miscellaneous supplies of small pieces for ploughs &c.

Yield of timber: remarks on Statement 53.

149. The statement No. 53 shows, however, sufficiently well what the yield under *a.* and *b.* is.

I have already called attention to the enormous demand in Kúlú for trees, shewing, if this is to be kept up, how essential it is that demarcation should not be delayed, since it is absolutely certain that *all* undemarcated forest will gradually disappear.

I have the strongest objection to the sort of forestry which is 'quite sure' that such and such forests are capable of yielding so much, without a definite survey and valuation; but certainly it may be calculated that to keep up a present annual supply like that shown in the table, amounting in Kúlú to 786,000 cubic feet (exclusive of the Government fellings) a demarcation of only 70,000 acres, the greater part open to rights, is a very small minimum.

It is also significant, with reference to the demand for revenue, that the timber cut in this Division including Kangra and Hushiarpur,—the undoubted and absolute property of Government,—would if paid for even at the low rate of 8 cubic feet per Rupee, have brought in a revenue of Rs. 1,03,000.

The Statement under *Ráwalpindi* shows trees for which permits are issued by authorities over whom we have no control. Mr. Elliot says.—"I do not for a moment wish it to be supposed that the number of trees shown as cut, is correct. I only give what is stated. I imagine that if each item were doubled, it would be nearer the truth." Even however accepting the figures, we have another item of Revenue given away to the value of at least Rs. 23,800. These trees are really cut in the Government forest, for the most part at least. When enquiry is made it is said they are cut in "Guzára" but considering that the division into Government Forests and Guzára or unprotected forests was begun many years ago, but was never carried out, the distinction is altogether hypothetical.

150. A supplementary statement gives the yield for the year in material other than trees; but is, for this first year of trying to give it, necessarily imperfect.

JHELAM

Work in Kaghán.

151. The local fellings in the Dungagalli Range, were mostly sold on the spot: those of Kaghán were for export. It was intended to fell 2,000 trees, but the number could not be attained. The launchings were effected over a made slide 2,100 feet long and 20 feet broad. A trial launching on the 4th June of 414 logs resulted in only 3 logs being injured, and that owing to the accidental jamming of a log in the slide. The greater damage is done in felling the trees on very rocky and precipitous ground.

The stranded timber along the upper river was carefully cleared in autumn and again in the spring.

Size of wood received at Depôt.

152. The fellings of timber for 1876, have not yet affected the market, the supplies therefore have been chiefly of old logs and waif and windfall wood. The best wood was all caught at Baghám; here the average size was 13·38′ length and contents 25·64 c. ft. The smaller logs that got past Baghám and came to sale-depôt from the "Chandás" averaged only 9·17′ and contents 13·13 cubic feet.

Nearly all marked.

It is satisfactory to find that nearly every piece of timber was found to be marked.

The total receipts were :—

Deodár	... ...	840 logs	= 14,007 c. ft.
Pines	... ...	1344 „	= 16,498 „

The whole amount had been sold off except 64 logs Deodár, and 60 logs Pine.

RAWALPINDI.

153. This division has no river. Its fellings consist of timber trees chiefly in the hill forests which get entered in the statement 53, and of fuel cut in the rukhs below. Nevertheless, a number of the trees shown in 53 Statement, were used either for firewood or for charcoal ; such were most of the pines entered under "dry," also the oak trees and the olive.

The largest fellings are those done with neither examination or control, these have been already alluded to ; they are separately shown in Statement No. 53. The Murree station and the Brewery make considerable demands for fuel. The residents of Murree are supplied by Municipal tickets, the Municipality having at present the right of over-running the Government forests to obtain grass and firewood. It is to be hoped that on the settlement of the Forests this very obnoxious practice may be defined or wholly brought to an end. It is only a most clumsy substitute for a regularly considered plan of supplying the station with fuel, at reasonable rates. There is no reason why the Municipality of Murree should have firewood for nothing, out of Government forests.

The Murree Brewery took 21,679 maunds of dry wood, &c., for fuel besides a number of dry trees. Permits for Brushwood only were allowed to be issued by foresters : as this is chiefly *Adhatoda*, its removal does no harm, its reproduction is certain for cattle will not touch it. Lime and Surkhi kilns are also burnt with this material.

Charcoal.

154. Charcoal is chiefly supplied by the hill forests. Permits are issued for collecting dry or cutting green wood which is stacked and measured up. When this given over the purchaser may make it into charcoal or deal with it otherwise as he pleases.

Small supply remaining.

155. There is very little wood left in the rukhs in the plains or low hills under our control. In the 5 groups we have thus :—

I.—Margulla Rukh, about 10,000 acres with *some* fuel.
II.—Khairimúrt, about 1,000 acres with a fair supply.
III.—Kawagurh and Kherimár, a little dead wood only.
IV.—Kalachitta, too distant being from 30—50 miles off.
V.—Baghám, supply sufficient for encamping grounds on G. T. Road.

Other items of produce.

156. There are various other items of smaller account ; amongst them *Vitex* used for basket making, and very many walking sticks of Olive, *Pyrus*, &c.

FUEL RESERVE NORTH.

Material not at present in demand.

157. Scarcely anything has been sold from this Division, except a quantity of "behikar" (*Adhatoda vasica*) sold to the Department Public Works for lime burning. The other sales consisted chiefly of dry wood.

But enquiries were being made.

Some large requisitions were made, but as there is no wood in the rukhs near at hand available for cutting, and as the right to cut over and close other rukhs is entirely unsettled, it is impossible to comply with such requisitions. It is utter barbarity to clear rukhs in the Salt Range, unless we have full power to close the portions cut out, for reproduction.

CHENAB.

Fellings confined to dead trees.

158. The fellings consisted of 329 deodár trees, all dead or topsore.

Ornamental works.

159. For ornamental purposes, 20 Walnut, 10 Ash, and 15 Pencil Cedar were felled in 1875, and left to season : by an oversight they were not entered in 1875, and so are included in this year's return. They gave 78, 17, & 20 logs respectively. The trees here, as in most divisions, are felled with the axe and logged with cross-cut saw.

The amount of timber is usually swelled by windfall, which yielded during the year as many as 2,153 logs.

The deodár logs and the "fancy wood" were all launched, leaving only some pine logs in the forest.

160. I regret to say that the launching means throwing down the hill. Though Mr. Forrest says he only allows launching to be over places not very bad, he admits that in launching 2,000 logs, 208 were broken or the heavy percentage of 10·50.

The difficulty of course is that we have only to work out windfall and dead trees which occur in scattered portions of the forest, and it would be necessary not to make one slide, but a number for a very few logs each. I cannot help thinking, that ingenuity and forethought would overcome this to some extent. The Chenáb is however almost as precipitous as the Sutlej, hence the extreme need of securing all the forest *and waste land* possible in positions where the difficulty of launching will not be so great.

Old Depôt at Jhikár being washed away

161. On the *river*, the old site of the Jhikár depôt is gradually disappearing by river action. The new site is about 7½ acres, has been strongly fenced, and is much better situated, being more directly behind the Railway "bund" and protected by it.

Mr. Forrest has consulted the Engineers, and finds that no work except of an enormously costly nature could be undertaken to secure the old depôt site: it must be moved as required.

Depôt at Multan.

162. At Múltan a permanent depôt has been created. 8 acres have been purchased and 5*a*, 36*r*. are held on lease, but it is hoped they will be purchased, as a much cheaper arrangement.

Quality of timber.

163. The receipts of timber were mostly short, 9-12 feet, and average contents 10·30 cubic feet, timber not very good, being small and shaken.

Ravi.

Diúr forest.

164. I visited the working of Diúr forest and stopped it, as the logs were rolled about without any slide, and knocking against standing trees, barked them; this will in some cases cause their death. The logs should only be dragged by cattle; but it is absurd to try and work logs from Diúr. Local conversion is necessary, and work with a few trees cut by selection, should never have been commenced.

State of Depôts,

165. Mr. Pengelly reports the upper depôts to have been in great confusion, but much has been done to set them right; this is due a good deal to the fact that for some time I had no second officer for the Ravi.

Quality of timber.

166. The timber received is small, logs averaging 12·50 cubic feet. It is to be remembered however that the difficulties of launching are considerable and the fact that few living trees are now felled, unless thrown down by storms, and that the chief timber demand is for sleepers, combine to render short lengths the most common product.

Beas.

Felling for export.

167. The trees felled for export form only a small proportion of the fellings given in the table (No. 53 form.)

The launching on the easy slopes of the Beás was effected without slides artificially constructed, but only 2·5 per cent breakages occurred. No other river however has easy slopes like those of upper Kulú.

State of the Depôt at Wazír Bholar.

168. The Railway authorities having constructed a 'bund,' diverted the water away from the Wazeer Bholar depôt; and the logs rafted in autumn have to be landed below the bridge, and if not sold *in situ* have to be taken to the depôt in the rains, when the river rises.

Size and quality of timber

169. The average size of deodár logs is 13′ and pines 10′ in length. Deodár averages 23·7′ cubic contents and pines 16·85′. The Chil deteriorates rapidly in depôt, it is desirable to sell by frequent auctions and not keep it lying in order to secure a fixed price. The girth of deodár is small and wood is knotty.

170. Large quantities of trader's timber continue to come down the river; the

Trader's timber.

rafts are all examined to see that it is not stolen Government timber.

The following table gives details :—

Statement of Timber exported by Traders during 1876-77.

No. of permits issued.	No. of Rafts.	Description of timber.						Total.	Remarks.
		Purchased from Government Forests.			*Purchased from Zemindars.*				
		Chil pieces.	Other pieces.	Bamboos.	Chil pieces.	Other pieces.	Bamboos.		
258	740	13,076	...	11,825	6,409	26,006	1,05,844	1,62,660	Besides timber entered in this statement 5,600 pieces of Khalava (wood used for making Combs) have also been exported.

SUTLEJ.

Quality of timber: how disposed of.

171. Nothing special to report, the details of receipts and issues being given in the tables. The logs appear to have been small, though the lengths are not stated, the average contents for Deodár were 14·23 cubic feet and P. Excelsa 14·77. The chief consumer of timber was the Sirhind canal, but the Indus Valley Railway were taking over timber fast, and, but for the fact that the formal receipts were not given within the official year, the sales would appear much larger.

Yield of Kalesar.

172. Kalesar yielded 1,494 Sál poles, to the Western Jamna canal, they are believed to be the last fit to cut for some years to come.

Percentage of different year's fellings received in depôt.

173. The only serious complaint I have to make is the failure of the rivers to notice the date on the logs; it is essential to keep up this information. Since 1872 at least it has has been the practice to mark the year on each felled log, and there ought to be no difficulty in telling what percentage of each year's logs (excluding all that are undated) comes to depôt. The information is of great practical import, as the average of several years (eliminating the special effect of unusual floods, or unusual droughts) would enable us to tell how soon we may expect at depôt, timber felled in any given season.

Mr. Pengelly has been unable to give the return for the Ravi.

Jhelam has had no fellings until this year, hence the receipts are old logs or waif, not bearing dates.

The Beás has given the return in a slightly different form, *viz*: proportion of those received marked with a given year to the *number* launched in that year. This is not required. We want to know that of (say) 3,000 logs received in 1876, 50 per cent were of 1873 felling, 20 of 1875, 5 of 1870, 2 of 1868, and so on.

The Beás figures taken in this way give (1,463 marked logs received).

Previous to 1870	...	114	...	8·0 per cent.
of the year 1870	...	88	...	5·5 "
" 1871	...	62	...	4·5 "
" 1872	...	57	...	4·0 "
" 1873	...	145	...	10·0 "
" 1874	...	0	...	0·0 "
" 1875	...	950	...	65·0 "
" 1876	...	47	...	3·6 "
		1,463		

The Chenáb figures (which should be given separately and not with form 55) show ut of 17,300, marked logs,—

Previous to 1870	...	141	=	0·8 per cent.
of 1870	...	371	=	2·2 "
" 1874	...	725	=	4·2 "
" 1875	...	9,970	=	57·5 "
" 1876	...	6,093	=	35·2 "

FUEL RESERVE DIVISION (CENTRAL).

174. The following is a statement of the Rukhs cut :—

District.	Rukh and extent.	Acreage cut.	Prevailing species of trees.	Method and extent of cutting and quantity removed in Cubic Feet.	REMARKS.
Lahore ...	Rana Chedu 471 acres,	471	Karil and Jand ...	Trees above 10 inches in girth cut, leaving a reserve estimated at 10 Maunds an acre (57,790). ...	Commissariat Meean Meer. Does not come into proposed Reserves.
Ditto. ...	Khana Nepál 468 acres,	468	Ditto. ...	Ditto. (24,868) ...	Ditto.
Ditto. ...	Baikuntha 2,357 acres,	500	Ditto. ...	Not stated. (10,836) ...	Ditto. Grass belongs to Cavalry (Proposed Reserve).
Ditto. ...	Kalpi 297 acres ...	297	Karil and Farás	Clear cut, reserve 8 maunds per acre (11,800) ...	Punjab Northern State Railway, (not in Reserve).
Ditto. ...	Kapi 2,865 acres ...	2,865	Karil and Pelu,	Clear cut above 1′ girth, Reserve about 10 mds. an acre. Natural growth of young Kikár (1,16,000) ...	Ditto, Closed to grazing—comes into proposed Reserve.
Ditto. ...	Khaira 2,654 acres ...	2,654	Ditto. ...	Ditto, (80,000) ..	Can only be partly closed but is a Reserve.
Ditto. ...	Mahadevi 15,773 acres,	15,773	Ditto. ...	Clear cut, above 10′ girth K. and J. for railway, arrangements for cutting out Pélu also made. Reserve 5 maunds per acre, (1,60,484) ...	Punjab Northern State Railway. A portion only will be reserved as the rest is too bad soil.

Ditto. ...	Marh 4,573 acres ...	4,573	Jand and Kíkar ...	Kíkar above 2·5′ and Jand above 10,′ reserved 15 maunds per acre. Natural reproduction good (39,035) ...	Punjab Northern (State) Railway. Proposed Reserve (closed).
Gujránwalla ...	Hameki 2,276 ...	2,276	Ditto.	Felling in progress only (1,93,063) ...	Ditto will be closed when cutting is done.
Ditto. ...	Hardomakí 3,884 ...	3,884	Ditto.	Ditto. (62,360) ...	Ditto adjoins Hamoki.
Montgomery ...	Rukhs Nos. 1 and 3 to 9, also 15 and 18 in Gugaira tahsil ...	2,445 36,575 2,336 1,397 2,805 4,110 6,570 31,648 4,967	Not stated	Cutting in progress, not stated whether whole is to be cut or what. No. 1— (94650) „ 3—(145800) „ 9—(140205) „ 15—(538400)	For Scinde, Punjab and Delhi Railway, not stated whether in proposed Reserve, but can be closed.
Multan ...	Vinoi 516 acres ...	?	Jhand and Farás ...	Part of area clear cut, (56,035) ...	For Commissariat Múltan and Indus Valley (State) Railway, (closed to grazing).
Ditto. ...	Kaurawalla 444 acres, Makdumpur, 1,674 ...	? ?	Do. Do.	Ditto. (25,000) ... Ditto. (55,374) ...	Ditto.
Mozuffurgurh ...	Jalari 4,053 acres ... Jalwala 1,247 „ ...	900 130	Do. Do.	Clear cut ...	For Indus Valley (State) Railway, apparently in the new proposed rukhs ;—can be closed to grazing.

175. This table is not of great use except as giving an idea of the demand.

The parties requiring fuel were as follows :—

		Cubic feet.
Commissariat Multan	... ...	81,034
Do. Mean Meer	... ...	82,658
P. N. S. Railway	... ...	5,95,382
I. V. S. Railway	... ...	55,374
S. P. D. Railway	... ...	9,92,251
	Total ...	18,06,690

I trust that we are now at an end of the old fashion of rukh management : and that even next year, or at any rate the year following, will see fellings arranged by blocks and compartments in a proper series with estimated and actual outturn of each.

176. Of the minor yield of these rukhs the supplementary table to form 53 (with which that in last Report para. 144 may be compared) gives the detail.

" Malla patti," the low growing shrub (*Zizyphus nummularia*) is not now allowed to be cut in any rukh which it is intended to keep as forest.

Plantation.

177. There is yet no regular yield ; all cuttings though saleable, are still improvement cuttings.

As an experiment however as to yield, 11 acres in compartments 75 and 76 were cut ; they were over 8 years' old, and 40 Reserves per acre were left standing. Each tree felled was numbered, the height and girth taken and registered, after which it was cut into three pieces : the average weight in maunds per acre was then taken ; finally the wood was dried and weighed again.

No. of Acres.	*Actual weight of saleable wood.* Green.	Dry.	Weight of branches.	
	Maunds.	*Maunds.*	*Maunds.*	
1	444	399	209	The average height of trees felled was 33 ft. and the girth 1'-5"
2	453	310	219	
3	562	373	320	
4	493	304	265	
5	452	354	195	
6	628	362	243	
7	351	113	129	
8	539	354	206	
9	603	356	216	
10	471	279	197	
11	674	416	254	
	5,670	3,620	2,453	The dry wood was sold @ Rs. 14 per 100 maunds stacked on the spot.

CHAPTER II

SECTION IV.

FINANCIAL RESULTS.

General results of income and outlay.

178. In all remarks on Finance I give Rupees only, adding one for fractions over the half Rupee, and neglecting fractions below the half.

The general Revenue and Expenditure is shown in the Form 49. Compared with last year, we have :—

		1875-76.	1876-77.
Revenue.		9,05,742	5,98,754
Expenditure ...	A.	3,18,498	2,70,330
	B.	2,35,728	2,52,153
Total ...		5,54,226	5,22,483
Surplus ...		3,51,516	76,231

The surplus last year was really Rs. 1,52,058 and this year's would be more *viz :* Rs. 1,71,096 ; because in 1875, the stock had been *reduced,* whereas in the present year the stock has increased from 4,04,814 cubic feet of saleable wood at the beginning, to the closing balance of 4,16,558 cubic feet : * And we have to add (as per Form 60) to the Rs. 76,231, the difference in favor of year Rs. 94,865; total surplus Rs. 1,71,096 (*vide* Form 60).

Sales not concluded in time to come into the account of 1876.

179. It may also be observed that there have been considerable sales which did not happen to be concluded in time to get the cash results into the year : this was specially the case on the Sutlej. Indeed there is always some difficulty in this matter, which necessarily causes one year to show better in stock and another in cash. On the Ravi no rafting is possible till the floods subside in September ; the timber has to be taken down to Shahdara in the Autumn, and there remain only the months till March, in which to arrange the depôts and go through the whole process of sale. In this way it was found that much less was actually sold than was expected.

Reduction of charges under "A I.

180. The point which I submit to be satisfactory about the year's results. is;—that the expenditure under timber heads (A I.) has been steadily kept down. In 1876, it was Rs. 1,41,631 ; in 1875 it was 1,52,137, in 1874, it was 2,08,552 ; in 1873, 2,07,868.

It is true indeed that the material produced was somewhat less (though by no means proportionally so) in quantity ; but then the expenditure of this year includes sums spent on the Ravi and Chenab for Timber felling, and also the expenditure on the regular felling on the Jhelum, all of which items have no relation to the receipts of the year. In 1876 our depôt receipts aggregated 6,51,899 c. ft ; in 1875 they were 7,03,615 cubic feet, in 1874 7,87,375 c. ft. and in 1873, 6,41,249 c. ft.

It is really by keeping down large expenditure on unprofitable timber operations, contracts for fuel, and so forth, which yield large *returns,* but small, if any, *profits,* that we must make our balance.

The prospects of the province as regard revenue.

181. I have read with very great satisfaction, the remarks made by the Government of the Panjab, on the question of Finance, in the orders on the last Report. My hope now is to see such principles recognized as regards this Province by the Government of India.

* Not including timber in transit in either case.

182. The deep impression made on the minds of many officers is something that would hardly be believed by any one not in constant intercourse with them.

Mr. Moir for instance, an officer above the average ability, has repeatedly deprecated by representations in his letters, my desire to reduce the rukh area to such a limit, as Government will give me (*a*) the real right to control, and (*b*) the Establishment to control properly,* on the ground that he is afraid of *being blamed* for the reduction of income, that such a plan will at first produce. Exactly on the same ground I have had great difficulty in inducing officers to refuse to allow rukh land to be cultivated, (*except* only where its being so treated is directly an advantage to subsequent forest cultivation) Both these purposes however have been distinctly approved by the Local Government.

The one argument used is this ; " it is all very well your saying that present income is not of consequence compared with real economy and true progress in planting and restoration of our illused forests ; but if so, how is it we can never get an Establishment sanctioned, or our own numerical strength, pay and prospects put on a satisfactory footing ?"

It is of the utmost importance that forests which are *in a condition* to pay, should do so fully : but it is of primary importance to determine what forests ought to pay, not to make an indiscriminate demand from all alike.

I am quite confident that if this province is, just for the present, let to pay its way with a moderate surplus only, and meanwhile a good staff given us to settle our forests, demarcate, determine their yield and treatment and get all rights really settled, (while at the same time planting works in the plains are pushed on) we shall in a few years begin to pay right well.

Necessity of securing forest area.

183. The only retarding cause that I see to this province becoming a really paying one, is the difficulty of getting the preliminary work done. I want to see our forest area secured, demarcated, its yield known, before I work it. It is most dangerous work cutting rukhs, before we know what the real yield is, per acre, and whether if we cut the rukh, we shall be allowed to close it. Yet the settlement of these matters demands intelligent officers, and yields at first no money return.

Temptation to act otherwise and get credit for immediate financial success

184. At the risk of repetition I can only say as before, how easy is it is gain credit on the other tack : — why not let it be known that I am willing to take offers from speculators for every rukh I have. ? why restrain the Contractors casting eyes on the northern rukhs ? why refuse to cut living trees on the Ravi, Chenab, and elsewhere, before our " possible yield " is fixed ? I could easily make much more money, and the probability is that I could do with fewer officers, and that quite safely. No one would find it out in *my* time, and even after I was gone, with the haze of a few years over the facts, I could easily justify what had been done to the, at any rate *primâ facie*, satisfaction of any ordinary criticism.

Free grants of Forest produce

185. One other danger also I see, the tendency to allow free grants of forest produce, too liberally. No other Department does the same.

The Jails supply paper, printed forms, tents, &c. &c., but in no case do they fail to recover payment (either by transfer or cash) for the smallest item. The same with every other work done by one Department for another.

But it would seem to be the prevailing idea that forest is common property ; the Military Department gets grass for nothing, to the great detriment of lands which might yield wood. Recently even the Customs Department has claimed to take material for their hedge free, although it would cost Rs. 8,000 a year. Only a portion would come out of *Government forests* in any case, but the principle is the same. Villagers who have had large areas of land given them on purposes to graze on it, have cultivated it for their own profit, and at once it is supposed that the Government lands *must* give them free grass and free wood ; and what is worse, it is attempted actually to be asserted that Government lands cannot be enclosed to produce wood fuel, &c., on account of the so-called hardship to these villages. This tendency to free grants, should I think be carefully watched ; *unless* it is taken into consideration, (which it never is) when considering the sanctioning of establishments and so forth.

* By which I understand three things :—*first* that the lower subordinates should not have an area to *patrol* which no man can possibly manage to go round conscientiously ,—*second*, that the upper subordinates should have such decent remuneration and such position (which, say what we will, follows pay to some extent) as to be at last without excuse for peculation and acts of oppression ; *thirdly* , that the area should be such that the officer in superior charge should be able to visit it all thoroughly, and give real supervision to planting, thinning, pruning &c. &c.

186. This inability to get over the 'payment question' is why I so much regret that the clear orders of this Government as to the credit of forest revenue have never been carried out. The income would then be visible: and as no one could take the credit of it, there would be an end to felicitations on the amount of general revenue, and officers would look first to their legitimate duty and only congratulate themselves on an increased revenue, when it was really produced by their skill and attention.

Credit of Forest Revenue to one head of account.

187. So much briefly, for the general Financial position. It will be desirable to notice some specific points. Timber and grazing continue to be the chief items, but "minor produce" is not to be despised, and is a point to which I am endeavouring to direct more attention.

Items of Revenue and expenditure considered *seriatim*.

Minor produce.

Forest officers are not merely concerned with cutting timber or planting trees; they are managers of Government Estates entrusted to them, and have to make the most they possibly can in every direction out of the Estate, *consistently with the object of the owner*. This of course may compel him, *e. g.* to grow trees for fuel though cereal crops might (with a pecuniary object only in view) pay better; he may also be compelled to maintain, instead of felling, the stock on the mountain side, because the owners object is to preserve the soil, &c.

188. First as regards timber. We have only sold nearly 3 lacs worth of wood as against nearly 6 lacs last year. But then we had a large store of sleepers ready cut from former years which being unexpectedly taken over by the Rajputana Railway, enabled the Beás to realize at once, over two lacs of rupees. Of course this could not be looked for, a second year.

Timber sales.

189. The remarks of Divisions on the subject of sales may be noticed. They will indicate that the stock offered for sale was not of first rate quality, which considering the small amount of new fellings, is not to be wondered at.

Jhelam.—On this river, it may be recollected, no fellings have for some years past taken place, hence of course the quantity of timber at depôt has gradually diminished, and while in 1875, we had 1,04,568 rupees worth sold, in 1876, we had only 65,908 Rupees. Considering that the Kashmír traders on the Jhelam have fresh-cut timber, which is obtained chiefly by free-labor, and is therefore both cheaper and better—the wonder is, that we sell, as well as we do, our old waif and other stock. The State Railway who took our timber as long as we had it good, this year, took one lakh worth from Kashmír.

Chenáb.—Precisely the same circumstances affected the Chenáb. The State Railway took 35,000 cubic feet against 60,000 which we had hoped for: the wood that came down was smaller and worse than was expected; from this cause a considerable diminution of expenditure on rafting and landing occurred. This will be illustrated by the comparison of the cubic contents of the material, with the realized income; for 11,104 logs containing 1,33,165 cubic feet give an average of 9·44 cubic feet only to the log, and yielded 62,745 Rupees or about 7½ annas per foot.

Ravi.—The Ravi had a fairer stock of timber: it was here more a question of the time necessary to effect sales; the wood was quite equal to keep up last year's figures, as far as I can judge, but when the year closed, there was much still unsold.

Beás.—The Beás is the river that shows the greatest contrast between the two years. In 1875, it sold 2,33,457 Rupees worth, in the year under report only Rs. 32,539. That is due to the sleeper stock being cleared off as I have explained.

190. The cost of producing this timber for the market is attempted to be shewn by the form No. 58. But as this is the first year of publication, I cannot hope that it gives quite uniform or satisfactory data. It was not possible for me to determine *a priori*, what should be the quota of expenditure charged to timber: the only way is to get one statement made as best it may, and then on the basis of that, determine what items we will admit in future. The principles proposed are various, but that advocated by Beás is in my opinion quite inadmissible.

Cost of production of timber

Mr. Brandis has sent us a memo: on the subject, and I only hope to be able to come to a definite understanding by personally discussing it with a few of the most experienced officers when we have an opportunity of meeting in the winter.

Collected in a brief form the result of Tables 57 and 58, give :—

Division.	Expended.		Received.		
	per c. ft.	per cubic ft.	per c. ft.	per 100 c. ft.	
Sutlej ...	0 5 3	32 13 0	Pines. 0 4 7 Deodar. 0 7 10	28 11 3 48 15 0	
Beás ...	0 8 4	52 4 0	Pines. 0 3 11 Deodar. 0 14 0	24 5 0 88 12 0	
Ravi ...	0 4 4	27 4 0	Pines. 0 4 8 Deodar. 0 12 3	29 3 0 76 9 0	
Chenáb ...	0 1 9	10 15 0	Pines. 0 7 6 Deodar. 0 3 1	47 3 0 19 4 0	It must be remembered that the Chenáb timber receipts were numerous but in small pieces.
Jhelam ...	0 9 3	57 13 0*	Pines. 0 5 6 Deodar. 0 3 1	34 6 0 19 4 0	* High rate of expenses is due to the facts that the year's expenditure in which it is calculated, very partially refer to the timber received, and chiefly to the new fellings, which will come down later.

The conversion into rates per hundred cubic feet is made to enable a comparison with the table at page 46 (para : 138) of last year's report.

Cost of producing timber for Public Departments Form 59

191. The form 59, (which is 'suggested') is blank. We have no special works in progress for any Department. Whatever material has been sold to Public Departments, has been sold out of our common stock, and consequently the cost of production is that shewn under form 58. The only difference in cash results is that occasionally a Public Department taking a large quantity of material, is accommodated by a reduction, or a general rate is allowed for a certain class of timber instead of different rates for each different length. Obviously the same may be, and is, granted to any large purchaser.

I apprehend that form 59 is intended to be used when special work is undertaken (like the great sleeper works of the North West Provinces) and when there is a special expenditure to be compared with the income obtained.

Grazing and grass

192. The grazing income amounted in all to Rs. 1,80,933 against Rs. 162,488 of last year. This is due to some extent to the marked improvement in the Revenue for the Fuel Reserves North. There are still heavy outstandings of past year's grazing leases in the District of Gujrat. This has been specially reported to the Financial Commissioner. Meanwhile some recoveries are going on. It will be observed that this income has been kept up notwithstanding the number of rukhs closed ; but it cannot be expected to be maintained when the reduction of area under our charge is sanctioned.

Bamboos.

193. Bamboos from the forests in Hushyárpur and Kangra (we have scarcely any other) now yield no inconsiderable item of revenue, in spite of the fact that some are granted free. The income is Rs. 12,284.

Minor produce

194. For the items which make up the minor produce, the appendix to form 53 will give a fair idea ;—next year I hope to have it more complete.

195. Under the head of timber removed by purchasers, the total was Rs. 17,227. I hope this will progressively diminish. In Jhelam it was still 6,665 but this I hope will disappear as soon as the Hazará depôts are in full work. There is some doubt what the Rs. 4,908 under the head of Sutlej is, as timber granted for Zemindars in Basahir, in pine forests (and even deodar) is granted free, but the amount may be from Kalesar.

Timber removed by purchasers.

196. The head "waif" is not yet fully distinguished. As a rule, waif found in the river when clearly ownerless, is marked for Government and brought down with other timber. It would be difficult to separate the expenditure incurred on such timber. The Beás Division has the waif receipts shown; while the Sutlej, which has some charges against waif, has no receipts separately shown. I cannot say that I think the separation is of much importance.

Waif.

197. Under Head 4, there is an item of Rs. 442 Revenue from shared forests or private forests *not* managed by Government. This must be a mistake (as regards the heading) but I have not been able to trace the origin since the account was received in this form from Accountant General.

Shared forests *not* managed by Government.

Expenditure.

198. The expenditure heads may now be taken into consideration.

It must be borne in mind that the expenditure on Government timber operations (A I) amounting to Rs 111,631, has only a partial connection with the timber brought down in the year. The longest item Rs. 46,215 spent on the Jhelam, was chiefly for the regular working of the Kaghán forests, this timber will not be received at Depôt till 1877 and 1878 at the earliest.

199. Under A. V. (Rent of leased forests) appears the rent or seignorage charges, of the Sutlej, Chumba Forests and Hazará. The first includes both the seignorage payable under the existing lease to Basahir, and the shares of Kalesar, (which is a shared forest *managed by* Government,) 9 out of a total of 20 shares, going to certain Jághírdárs. The Chumba forests show the fixed minimum seignorage of 21,000 Rupees, and the sum under Jhelum represents, half seignorage paid for every tree cut, according to the published sanctioned schedule of rates for each kind of tree.

Rent and seignorage.

It is believed that few other Provinces have such a large sum to pay as Rs. 35,464 for seignorage or rent, and this should be borne in mind in drawing comparisons.

200. Under A. VIII, the only noticeable figures are the charges under Fuel Reserve Central for the survey and valuation of the new selected Reserves in Múltan and Montgomery now drawing towards completion.

Survey, &c., and forest improvement.

Under the sub-head *d*, is shown the expenditure on artificial plantations. The principal item is Rs. 31,167 in the plantation Division.

It may be also here mentioned that this head shows no charge under Fuel Reserve Northern Division. The works of fencing, embankment &c., preparatory to reboisement, and costing Rs. 3,082 being shown under the last sub-head (f "other works.")

Review of receipts and expenses in Plantation Division.

201. This will be a convenient place to introduce some remarks on the Finance results in the 'Plantation Division.'

The following table shows the cost of extension and maintenance compared; attention is invited to the marginal explanation against Bouli Lehna Singh.

Plantation.	Area in 1875-76.	Area added in 1876-77.	Cost of maintenance during 1876-77.			Cost of extension during 1876-77.			Total.			REMARKS.
Chánga Manga ...	8,172	940	15,322	1	11	9,841	9	7	25,163	11	6	
Jugian Shahdera and Mehmud Búti ...	1,200·50		920	2	9				920	2	9	Of this Plantation area in 1875-76 343 acres were lost and replenished in 1876-77.
Jhoke & Sadhanwáli,	1,187·50	145	2,677	15	7	517	4	0	3,195	3	7	
Nág	412		471	4	5				471	4	5	
Phillour	239		172	7	3				172	7	3	
Ludhiána	190		316	2	0				316	2	0	
Umballa nursery ...	1		10	3	0				10	3	0	
Kathála	26		336	11	3				336	11	3	
Kikranwali ...	576		182	0	6				182	0	6	
Carob plantation ...	37		215	5	9				215	5	9	
Bouli Lehna Singh,		100				4,867	10	3	4,867	10	3	A large proportion of expenditure is on account of operation for 1877-78 (such as making nursery ploughing land &c., for a contemplated plantation.
Kot Lakhpat ...						16	14	6	16	14	6	
Total ...	12,041	1,205	20,624	6	5	15,243	6	4	35,867	12	9	

Receipts.

202. The receipts amounted to Rs 15,496 against the foregoing expenditure. This is exceptionally small, because the main thinnings of the old plantation at Chánga Manga were *held back* for a year, to give them increased sale value. The cultivation proceeds were also less, but this is necessarily an uncertain item, as it depends on the water available, and the requirements of the plantation work whether land is left blank or not. The grazing it might be supposed, would be a more constant source: these receipts were:—

1873.	1874.	1875.	1876.
Rs 7,527.	Rs 6,024	Rs 6,556.	Rs 6,146

It is found however, that as the cover advances, the growth of saleable grass diminishes.

The great decrease is as, above stated, in sale of thinnings, which last year came to Rs 6,491, not allowing for a large quantity made over to the Fuel Reserve Division. The thinnings of Chánga Manga alone, were last year, 37,107 maunds saleable wood. Compared with these figures the outturn of thinnings effected are shown in the following table. The proportion of unsaleable wood is not large: but the tables are inconveniently expressed. If trees are sold, their cubic contents should be given, and the sale of fuel by maunds is now universally abandoned; the figures do not therefore at first sight, give any idea of what the results really are.

Name of Plantation.	Produce of Thinning.			Remarks.
	Saleable wood.		Unsaleable wood.	
	Fuel.	Brushwood.		
	Maunds.	*Maunds.*	*Maunds.*	
Changa Manga (felling experiment.) ...	4,504	„	2,900	Sold @ 14/- °/₀ maunds
Do. (thinning.) ...	10,290	„	16,000	802 maunds of this sold @ 14/- °/₀ mds. and 9,488 mds. remained unsold.
Do. (wind-fall trees.)...	516	„	1,000	Sold @ 14/- °/₀ maunds.
Shaderah	2,487	3,094	„	Fuel sold for 522/- and brushwood for Rs. 270/-
Jhok and Sadhánwali ...	800	2,000	„	Fuel sold for Rs. 65/- and brushwood remained unsold.
Nág	700	2,500	„	Fuel and brushwood sold for Rs. 230/-
Ludhiána and Phillour ...	9,226 trees	1,235	„	5,184 trees and 1,235 mds. of brushwood sold to S. P. & D. Railway, for Rs. 1,538/-, 551 trees to turners for Rs. 90/- and 359, remained unsold.
Kikranwáli	1,280	700		Sold for Rs. 331/-
Do.	5 trees.	„	„	
Total	20,577 and 9,231 trees.	9,529	19,900	

On the whole it seems to me that, the cost of watering and maintaining plantations, is now most reasonable : the system is settled, and there is no loss on experiments. The income is satisfactory.

Establishments &c.

203. The " B. Heads " of expenditure, show some increase, owing to the different salary which I drew as 1st class Conservator, and owing to some promotions ; hence the increase from Rs 2,35,728 last year to Rs 2,52,152 of this.

Travelling allowance.

As rates of travelling allowances increase in some cases with the officers' grade, the amount this year is very slightly in excess of last years' figures (1875=38,808, 1876=38,992.) Certainly travelling allowances are not extravagant. It is generally supposed that travelling in the Punjab is cheap, but allowance is not made for the constant increase in rates for mules and coolies made in Chamba and in Kulu, Kangra and Hazára. I can only say that travelling with moderate equipage in Chamba and Kulu, the Conservator's allowance rarely if ever covers the actual expenses, at the present rates.

Outstandings.

204. Statements 51 and 52 deal with outstandings. Under 51 (outstandings due by Contractors), two heads only call for remarks. The Fuel Reserve Central Division shows Rs 73,850 ; which is chiefly due to the maintenance of the total unsettled bill against Sikandar Khan, whose case was referred to arbitration four years ago, and is not yet settled.

In the Fuel Reserve Northern there are outstandings which are being reported on. most of them are nominal only, being the remains of contract works executed as far back as 1871-72, which were not credited with all the fuel really delivered, or credited at rates for wood weighed very long after delivery, and therefore less than the contractors could fairly claim.

205. Under 52, the outstandings in the Revenue Account do not call for remark. Those in Gujrat (Fuel Reserve Division North) are the subject of a special report. The amounts under Fuel Reserve Central have not been reported as of doubtful recovery.

Timber forms of accounts.

206. The timber accounts are shown in forms 56 and 60. I should have wished to have the items in 56 classified exactly as in 55, but the data furnished only enabled me to extract general rates which are shown in form 56.

The correction of form 60 (Timber accounts.)

207. It will be observed that the opening stock shown in form 60 is much less in value than the closing stock shown in the old form 28 of last year's report. As such valuation is partly by estimate, it is necessarily liable to revision. But in the stock shown there as in depôt or transit, it was found that a certain number of scantlings 13,633 in number were included in Sutlej, which it was afterwards found did not exist; and there were a few other scantlings not brought to book. The main difference (for that indicated would only account for a few thousand rupees) is that we have determined to omit *in valuation*, unrealized stock in transit. It is always liable to error, partly because what is in the river, can never be actually counted with certainty, and partly because a number of pieces never can be realized, floods and thefts preventing it. I have therefore given in timber account 60, what is *in hand* only. If the supposed stock in transit is added, we have :—

Opening balance.		Received.	Expended or lost &c.	Closing balance.
	Rs.	Rs.	Rs.	Rs.
Stock	... 2,84,242	4,46,685	3,41,515	3,89,412
Transit... ...	... 1,44,049	2,18,516	1,95,840	1,66,725
Total ...	... 4,28,391	6,65,201	5,37,355	5,56,137

208. I have to invite the attention of all Divisional Officers to the figures that now follow. The time has come when a definite record of statistics as to contract rates and timber prices must be kept up.

The first beginning made this year is very meagre; but this is excusable, next year I shall expect that *all* Divisions will give figures, and that these will be kept up accurately from year to year.

A.—The rates of timber work as far as obtained show the following:—

Nature of work.	Jhelum.	Chenáb.	Ravi.	Beás.	Sutlej.	Kalesur Dún.
Felling ...	.....	.....	4 annas per tree, 2 annas clearing branches.	1 anna to 6 annas per running foot.	4 annas per tree, 2 annas clearing branches.	For Sál poles according to size 1-9 to 0-8 per score.
Dragging ...	.....	6 annas per log to 18 feet in length, 12 annas above that.	4 annas per log.	According to size, distance from the river, &c.	4 annas per log, 2 annas for clearing branches.	.....
Numbering and marking. ...	.....	.....	Marking 1 anna per log, numbering 12 annas per °/₀ logs.	.....	1-8-0.	
Launching ...	.....	.....	8 annas a log.	.....		
Catching ...	.....	Riási and Aknúr 12 annas per °/₀ cubic feet. Baijwat, 1-0 per °/₀ c. ft.	6-4 per °/₀ cubic feet.	Catching and sending to Nadaon. Deodar, 7-0 per °/₀ c. ft. Pines, 6-0 „ „	Naila to Rupar, 15 to 10 per °/₀ logs. Below Rupar, 25 per °/₀ logs.	
Numbering ...	.....	8 annas to 9 annas per °/₀ logs, 1 per °/₀ per cutting marks.	.....	.....	1 per °/₀ logs.	
Cutting holes, &c. ...	.....	1-0 per °/₀ logs.	1 anna per log.	.....	3-8 per °/₀ logs.	

Nature of work.	Jhelum.	Chenáb.	Ravi.	Beás.	Sutlej.	Kalesur Dún.
Rafting * ...	Above Bagham 2-8 to 1-8 per °/₀ cubic feet according to distance. Below Bagham 3 per °/₀ cubic feet (51 miles.)	Riási to Aknúr, 1-4 per °/₀ cubic feet. Aknúr to Wazirabad, 2-0 per °/₀ cubic feet. Below that to Multan, 5-8 per °/₀ cubic feet.	Rs. 43-12-0 per °/₀ cubic feet for 200 miles.	From Nadaon Deodar, 8 per °/₀ cubic feet Pines 6 Do. Do. Rates diminish according as we approach the Wazeer Bholar depôt. Rs. 12 for collecting from river and sending to Wazeer Bholar.	16 to 21 per °/₀ logs according size.	To Jagadri. 2-8 to 1-13 and 0-8 per score according to size.
Landing at Depôt ...	Bagham Depôt 1-8 per °/₀ cubic feet. Jhelum. Rate as per log according to size, average = 2-8 per °/₀ cubic feet.	At Aknúr, 1-8 per °/₀ cubic feet. At Baijwat, 7-13 per °/₀ cubic feet Islands above. Wazeerabad 2-1 per °/₀ cubic feet.	In transit depôt 4-2-8 per °/₀ cubic feet. In Sale Depot 2-9-8 per °/₀ cubic feet.	25 per °/₀ logs (about 1-1 per °/₀ cubic feet.)	6 per °/₀ logs.	
Arranging in lines &c.,	.....	16-0 per °/₀ logs.	2-1-4 per °/₀ cubic feet.	.....	1-14-0 per °/₀ c. feet.	

* It is difficult to give the rafting rates, as in some cases each river gives a series of points on the river between which (owing to length or difficulties of rocks rapids, &c.) rates differ. In future it would be well to calculate the general average per mile (of whole rafting distance) per log, or °/₀ cubic feet, as the case may be, and supposing that the river exhibits very marked differences, calculate a separate rate for each principal section, e. g. on Jhelum, above and below Bagham.

209. The labour rates will be more completely given in future returns, at present we have :—

Workmen.	Jhelum.	Chenáb.	Ravi.		Beas.		Sutlej.
			River.	Kalatop.	Kulu and Kangra.	Hushyárpur.	
Coolies	.....	.....	.....	.....	Annas per diem. 2½—3 annas.	Annas per diem. 2	Annas per diem. 2—4 (3 annas at Philor)
Carpenters	.....	.....	.....	.....	4—7 annas.	3—5 annas.	.....
Masons	.....	.....	.....	.....	4—5 annas.	4—6 annas.	6 annas.
Sawyers and rates of sawing	.....	.....	Sleepers at 0/3/4 each.	20/- per °/₀ superficial feet for deodar and 22/- for abies Sirrithiana.	4 annas.	.....	.....
Sinking blast holes ...	.....	.....	.....	.....	.....	.....	5 annas for 1½ foot.
Cutting bamboos ...	.....	.....	.....	.....	4 annas to 1/- rupee per °/₀ according to size.	The same.	.....

210. Rates of work chiefly applicable to Plantation and Fuel Reserve Divisions, are this :—

Work.	Rawulpindi.	Fuel Reserve Northern	Fuel Reserve Central.			Plantation.
			Lahore, Amritsar, Gujranwalla and Montgomery.	Multan.	Mozuffurghur.	
Cutting fuel	.....	.....	1/12/- per °/₀ maunds.	0/6/3 per °/₀ c. feet.	18/- per °/₀ c. feet.	
Splitting and cutting up ...	.....	.....	.....	.....	.....	.....
Stacking	.....	No work in progress for which rates can be given.	.....	0/1/6 per °/₀ c. feet.	0/1/6 per °/₀ cubic feet.	4 annas per °/₀ maunds.
Carriage	.....	.....	0/9/0 per mile per 100 maunds.	0/14/10 for 8 miles per °/₀ cubic feet.		
(Earth work) Excavating ...	.....	.....	.....	.....	.....	1/7/- to 2/- per °/₀ cubic feet.
Embankment	.....	.....	.....	.....	.....	2/8/- per °/₀ cubic feet.
Silt clearing	.....	.....	.....	.....	.....	1/8/—1/12/- per °/₀ cubic feet.
Thinning plantation	.....	.....	.....	.....	.....	.....
Prunning do.	.....	.....	.....	.....	.....	.....
Collecting seeds	.....	.....	.....	.....	.....	Sissú—6 annas to 1/- rupee per maund Bér —1/- to 1/4/- maund Mulberry—1/8/- to 1/14/- Kikár—0/13/- to 1/- Jand—1/- to 2/8/- per maund.

Prices realized at depôts.

211. The market prices realized at sales depôts are summarized as follows :—

Jhelum. All first class logs of Pines and Cedar sold readily at the regular rates. Other timber fetched from 8 annas to 5 annas a cubic foot for Deodár; 4 annas for *P. Excelsa*, and 2 annas for other pines.

Average.

1st Class Deodár	Full rates.		
Pines	Do.		
2nd Class Deodar	0	6	6
P. Excelsa	0	4	0
Other pines	0	2	0

Chenáb. Allowing for special deductions made to large buyers, the following rates were obtained (Wazirabad and Multan).

1st class Deodár, per cubic foot	Rs.	0	10	10
2nd Do. do.	„	0	5	7
1st class Pine, do.	„	0	9	6
2nd Do. do.	„	0	2	9

Ravi. The information is not given, and must be supplied next year, both for 1876 and 1877.

Beás, The rates show at Wazeer Bholur :—

1st class Deodár, per cubic foot	Rs.	0	15	0
2nd Do. do.	„	0	9	11
Pines longifolia do.	„	0	4	6
Deodar Sleepers do.	„	0	13	6
Chíl do. do, ...	„	0	4	6

Sutlej. The following rates were given :—

1st class Deodar, 7′—12′ per cubic foot ...	0	10	8	But we should know the general average value per cubic foot of all 1st class Deodar together.
Do. 12′—14′ do. ...	0	13	10	
Do. 14′—16′ do. ...	1	1	3	
2nd class Deodár, per cubic foot	0	6	1	
Pines (P. Excelsa) do.	0	4	7	
Sal poles, per score	21	2	4	

Prices are as good as could be expected.

212. These prices are certainly satisfactory, that on the whole when it is recollected that the rates obtained represent, for the greater proportion, rates for logs, which are old and have been in the water or lying about for years. No fellings have taken place in the Jhelum for several years past. On the Chenáb only dead and dying trees have been felled. In the Ravi the same. It is only during the last year that some fellings began again on the Ravi, before there is any sort of working plan for the forests,

These prices are maintained in spite of large imports on the Chenab, Ravi and Jhelum from Kashmír, where the forests are felled without a care for the future, and consequently new and sound wood is sent down, and where also two-thirds of all work that we pay for, is done by forced gratuitous labor, tending of course to make the material both cheaper, and to some extent better at present than ours,

The prices relate to timber in Depôt. Most other sales like those of standing trees in Pindi, Hazara, and the Beás, and of fuel in the Reserves Divisions are effected at fixed rates, according to printed schedules, so that there is no scope for exhibiting average prices.

But I think we ought to know the prices obtained for material sold in the Plantations specified year by year, (Mr. Minniken will easily supply this next year) and we might also arrive at a knowledge of what our grazing in open rukhs brings in *per acre* on the average.

CHAPTER III,

Unreserved Forests.

213. It is very difficult to speak of these. The fact is that the distinction of unreserved forests, has only a limited application to the Punjab.

The only unreserved forests that can still be so-called, are forests in Kangra and forests in Hazara.

The former in all Tahsils except Kangra, are under our charge in a general sort of way.

Management in Kangra.

214. The list of fellings for the Beás Division in para. 53 includes those cut in unreserved forests under forest permits. There is no management of those forests beyond checking the permits. The forests are however not allowed to be broken up for cultivation, nor burned. And fires do not occur, at any rate as a matter of course. The excellent para. 20 of the Kangra Rules about closing one-third of the forest has fallen into the most complete disuse. Permanent "tihais" or closed portions of the forest are kept up. I would strongly recommend this being put an end to, and the forests being opened or closed according to necessity as clearly provided by rule 25 (Kangrá Rules Mr. Melvill).

In Hazara.

215. In Hazara an area of forest land not being reserved forest, was supposed to be left as unreserved, but as it is not protected by any establishment, nor is any check put upon its gradual clearance in small patches for cultivation, it is not of much use calling it forest at all reserved or unreserved. It is practically forest at the mercy of the villagers subject to the nominal check of permits for cutting trees and for cultivating. The permits during the year, exceeded 1,41,000 trees, and the fellings actually effected must have been enormous.

I visited one village in Siran Range where on a permit to cut down "80 or 90 small Chil trees," three large patches had been cleared and burnt, one at a distance of half a mile from the others. I have specially reported on the subject, but unless an officer and a proper establishment can be appointed to the charge of these forests nothing will be done, for the area of the four detached ranges of reserved forest is already far larger than one officer can well look after.

Districts Rakhs.

216. The Rukhs not under charge of the Forest Department can hardly be called forests. Nor is there any object in keeping them as such.

They are waste lands belonging to Government which it opens for grazing and fuel cutting untill such time as they are wanted for cultivation. In some districts perhaps, the rukhs will always remain to some extent as Government grazing grounds. The amount to be kept and that to be left is still uncertain : hence for this year I have not given any area in form 45.

Bassahir.

217. The Sutlej Division has no unreserved forests properly, but it is the custom to give free timber out of the certain Pine forests in Bassahir, and those are spoken of but with doubtful accuracy as unreserved ; in these also tracts of lands wanted for cultivation are given up for clearance. No unreserved forests except in Kangrá are under our management.

CHAPTER IV.—GENERAL.

218. I have nothing to add except that the Reports from divisions were usually careful and satisfactory, all except the Sutlej.

The best of all were those of Colonel Stenhouse, Mr. Sparling, Mr. Moir and Mr. Minniken.

I do not wish to encourage large reports, but facts are needed and uniformly : the last year's Reports as printed being carefully studied to see that things are not allowed to drop out of memory.

Notice of Officers.

219. All officers now in the department have worked well, some very well, and that under difficulties during the greater part of the year, Mr. Minniken was quite unassisted, so was Mr. Brown, Mr. Sparling has had an unusual task with heavy fellings in Kaghan, and the burden of the division besides.

Subordinate Officers.

220. Among subordinate officers specially commended Mr. C. F. Rossiter, Forest Ranger is mentioned. I have formed also a high opinion of his intelligence and ability and the thoroughness with which he does his work. Mr. Pinder has also shown praiseworthy diligence in qualifying himself for promotion to a S. A. Assistantship. Both officers I hope will receive the step.

It is satisfactory to find that Mr. Fendall has at length been gazetted back to the Assistant grade.

Prospect of promotion of the subordinates.

221. It is much to be desired that some regular rule of bringing on to the staff a definite number of persons who have proved themselves by actual work in the Department, to be filed. The number should be limited, and I am extremely averse to appointing uneducated men. But as we are at present *obliged* to take men not professionally trained, I cannot see why it is that a special difficulty apparently exist in taking proved and tried men.

222. As to general remarks I have not much to say.

Seed years.

The information as to good seeding of species has not been rendered as I desired.

From the Raví it is reported that the Deodár did not seed, but acorns were specially abundant.

From Rawulpindi, there was very heavy rain in July, causing the Leh torrent to carry away a part of the town of Rawulpindi. This excited no kind of enquiry as to the cause of this torrent and whether it could not be regulated. By the time half the town is destroyed, some one will think of a scheme of embankment costing perhaps a lac of Rupees ; while the real mischief lies on the denuded hills beyond.

Phuláhí seed failed, and Chíl seed was scarce.

In Kúlú, *Deodar* and P. *Excelsa* seed was rare, so was Chíl seed in Kangrá.

Floods.

223. A Register of Floods is appended. It is hoped by a series of these tables in the course of some years to arrive at a better knowledge of the flood seasons on the rivers, which will lead to a more complete regulations of rafting and floating operations and to the preservation of timber.

B. H. BADEN-POWELL,

Conservator of Forests.

FOREST DEPARTMENT, PUNJAB.

LOWER JHELUM SUB-DIVISION.

List of floods for the year 1876-77.

No.	Month and date.		Height.	Duration.	REMARKS.
1	May. ...	17th	3 feet ...	9 hours	Water is rising daily.
2	" ...	31st	3½ " ...	24 "	River very low for the time of the year.
3	July. ...	21st	1 " ...	11 "	
4	" ...	23rd	4 " ...	24 "	The largest flood since 1874, large quantities of Trader's timber carried below Jhelam but no damage done to depôt, between 300 and 400 logs were caught at Bagham.
5	" ...	24th	2½ " ...	10 "	
6	August. ...	6th	3 " ...	14 "	Transit Depôt, nearly ¾ of Dehree Depôt was under a foot of water.
7	" ...	10th	2½ " ...	6 "	
8	" ..	23rd	3 " ...	15 "	
9	February 1877. ...	8&9th	4 " ...	2 days	Local flood.
10	" ...	20th	7 " ...	24 hours	Bridge of boats carried away, no demage to Depôt.
11	March. ...	20th	3½ " ...	12 "	

JHELUM
Dated 4th August 1877.

F. O. LEMARCHAND.
ASSISTANT CONSERVATOR OF FORESTS
Lower Jhelum Sub-Division.

RAVI FLOOD REGISTER.

From the Canal Gauge at Sidhouri.

			Maximum.				
April	1st	...	10·7	„	7th	...	8·8
„	11th	...	10·9	„	20th	...	8·1
„	12th	...	14·0	Novr.	1st	...	7·9
„	17th	...	11·8	Decr.	1st	...	8·0
„	21st	...	12·5	„	15th	...	7·7
May	1st	...	12·2	January	77.	...	7·6
„	31st	...	11·5	„	10th	...	7·5
June	12th	...	11·5	„	12th	...	10·0
„	13th	...	11·8	„	17th	...	10·6
July	2nd	...	10·8	„	31st	...	8·4
„	7th	..	12·8	Feby.	3rd	...	8·[illegible]
„	16th	...	14·6	„	4th	...	10·8
„	26th	...	15·6	„	7th	...	11·1
„	29th	...	18·0	„	10th	...	8·7
August	4th	...	14·6	„	22nd	...	11·4
„	5th	...	17·9	„	28th	...	9·2
„	6th	...	15·5	March	3rd	...	9·2
„	11th	...	15·3	„	10th	...	10·2
„	23rd	...	13·3	„	15th	...	11·1
„	26th	...	14·2	„	20th	...	10·8
Septr.	1st	...	9·8	„	21st	...	12·1
„	6th	...	11·1	„	25th	...	9·9
„	14th	...	10·4	„	31st	...	9·3
October	1st	...	9·4				

N. B.—The Gauge readings are made twice (sunrise and sunset) every day of the month. The above quantities are the maximum reading.

CHENAB DIVISION.

Register of floods for 1876-77.

Month and Date.		Part of the river effected.	Duration.	Remarks.
July 1876 ...	27th	Whole river ...	7 hours	19′ at 6 A. M. no loss of timber.
August „ ...	7th	do. ...	...	18′ 8 „ 12 A. M. no loss.
March „ ...	20th	Lower river from Aknoor downwards.	...	9′ 2 „ 9 A. M. The day previous river gauge read 5′. 400 logs in transit carried away but subsequently recovered.

E. FORREST,

Assistant Conservator of Forests

Chenáb Division.

BEAS DIVISION.

Flood Register.

(*From the Gauge at the Railway Bridge Beas*)

(Lower water level 128 feet).

1876.					
June.	1st	...	...	130′ 9″	
„	9th	...	...	130′ 13″	
„	30	...	...	129′ 1″	
July	2nd	...	...	129′ 4″	
„	7th	...	...	131′ 8″	
„	9th	...	...	133′ 11″	
„	10th	...	...	133′ 9″	
„	11th	...	...	133′ 8″	
„	12th	...	...	132′ 10″	
„	17th	...	...	132′ 10″	
„	18th	...	...	134′ 3″	
„	22nd	...	...	136′ 0″	
„	23rd	...	...	135′ 8″	
„	24th	...	...	134′ 11″	
„	28th	...	...	132′ 10″	
„	31st	...	...	132′ 8″	
August	3rd	...	...	135′ 4″	Continued close to this level till 8th.
„	4th	...	...	135′ 9″	
„	8th	...	...	135′ 6″	
„	9th	...	...	133′ 4″	
„	12th	...	...	135′ 4″	
„	22nd	...	...	132′ 10″	
„	24th	...	...	133′ 1″	
„	31st	...	...	131′ 4″	
Sept.	2nd	...	...	130′ 9″	
„	7th	...	...	132′ 2″	
„	13th	...	...	130′ 8″	
„	21st	...	...	131′ 2″	
„	30th	...	...	129′ 4″	

Flood Register of River Sutlej at Rupar, during 1876-77.

Dates.			Maximum height of Flood.	REMARKS.
March	1876 ...	10th	10·13	The river fell from sunrise to sunset after which it was very suddenly altering its maximum near mid-night.
May	„ ...	14th	6·50	
July	„	8th	10·80	7 A. M. to 12 noon.
„	„ ...	9th	13·60	9 A. M. to 11 A. M.
„	„ ...	10th	11·45	9 A. M. to 11 A. M.
„	„ ...	11th	10·70	8·30 A. M. to 12 noon.
„	„ ...	15th	10·75	11 A. M. to 1·30 P. M.
„	„ ...	18th	10·30	During night.
„	„ ...	22nd	16·75	1 A. M. to 5 A. M. at Head Works line of Dam 17·35.
„	„ ...	24th	11·40	10 A. M. to 4 P. M.
August	„ ...	2nd	13·67	4 A. M. to 5 P. M.
„	„ ...	5th	11·27	6 A. M. to 11 A. M.
„	„ ...	7th	14·20	2 A. M. to 4 P. M.
„	„ ..	9th	12·28	9 A. M. to 12 A. M.
„	„ ...	10th	14·85	
„	„ ...	11th	13·30	
„	„ ...	21st	11·00	10 A. M. to 5 P. M.
January	1877 ...	17th	6·30	at 12 A. M.

Dated RUPAR,

The 17*th March* 1877.

FORM.

FOREST DEPART

AREA OF RESERVED

N. B.—L. means that the forest is leased or subject to a

DIVISION.	NAME OF FOREST.	Area on April 1st 1876.		Added during the year.	
		Square miles.	Acres.	Square miles.	Acres.
JHELUM ...	Dunga Galli Range ...	63	40,383·20		
	Kaghán Range ...	90	57,487·00		
	Siran Range ...	33	20,986·00		
	Khánpur Range ...	50	31,786·00		
RAWULPINDEE ...	Murree Range ...	156·55	100,196		
	Kahútá Range ...	217·05	138,913		
	Rawalpindi Range ...	51·14	32,732		
	Fatteh Jung Range ...	72·90	46,660		
	Attock Range ...	60·99	39,038		
	Gujar Khan Range ...	12·48	7,983		
FUEL RESERVE NORTHERN,	(*a*) Rukhs in plains Jhelum ...	205·28	131,380		
	Do. Gujrát ...	34·34	21,976		
	Do. Shahpur (Bhera) ...	235·43	150,677		
	(*b*) Salt Range in Jhelum. ...	287·41	183,942		
	Do. in Shahpur (Khushób),	210·66	134,824		
	Total Salt Range ...	498·07	318,766		
	(*c*) The Pabbi Range ...	39·43	25,237		
	(*d*) Belas on islands on the Jhelum,	1·41	907		
	Do. on the Chenab ...	9·33	5,970		
CHENAB ...	Durwás Range ...	3·40	2180·70		
	Kilár Range ...	6·70	4287·90		
	Sánch Range ...	7·54	4829·11		
	Púrthi Range ...	13·95	8931·22		
	Tindi Range ...	1·77 27·73	1135·40 17749 E		
RAVI ...	Kalatop ...	4·48	2870		
	Kaintli ...	1·00	644·60		
	Bakle Range ...	2·00	1280		
	Bannikhet ...	...	...	...	537·13
	Basins of Siúl Rávi, Belj, Tunah, and the streams of the Chau-ráh,	150	96000		
BEAS ...	Kúlú Seorój and Rúpi ...	20·88	13,583		
	Nurpur Range ...	15·09	9703		
	Dera Range ...	16·39	11,132·14		
	Hamírpur Range ...	5·79	3708		
	Hushiarpur Range ...	7·56	4847		
SUTLEJ ...	Basahir ...	38·43	24,600		
	Kalesar ...	50·	32,000		
FUEL RESERVE CENTRAL ...	Amritsar District ...	4·25	2793		
	Lahore " ...	334·00	2,13,799		
	Gujránwalla " ...	379·00	242,693		
	Montgomery " ...	864·50	553,264		
	Multan " ...				
	Muzaffargarh " ...				
	Dera Ghazi Khan " ...				

NO. 45.

MENT PUNJAB.

FORESTS 1876-77.

payment to Co-sharers.—E. means that the area is estimated.

Excluded or transferred to other heads.		*Total on 31st March 1877.*		No. and date of Notification of additions.	REMARKS.
Square miles.	Acres.	Square miles.	Acres.		
		63	40,383·20 L.		
		90	57,487·00 L.		
		33	20,986·00 L.		
		50	31,786·00 L.		
		156.55	1,00,196		Nominal, by old settlement survey.—The figures will probably be entirely altered on re-survey.
		217·05	1,38,913		These figures are according to old Revenue survey, and include Military rukhs, &c.
		51·14	32,732		
		72·90	46,660		
		60·99	39,038		
		12·48	7,983		
		205·28	1,31,380		
		34·34	21,976		
		235·43	1,50,677		Chimerical figures as demarcation is purely nominal.
		287·41	1,83,942		Ditto.
		210·66	1,34,824		Ditto.
		498·07	3,18,766		
		39·43	25,237		Ditto.
	3	1·41	904		3 Acres lost by diluvion.
		9·33	5,970		Numerous islands very liable to change, area quite unstable.
		3·40	2180·70		Nothing can be said definitely of these, till demarcation is completed.
		6·70	4287·90		
		7·54	4829·11		
		13·95	8931·22		
		1·77	1135·40		
		27·73	17749 E.		
		4·48	2870 L.		
		1·00	644·60 L.		
		2·00	1280 E. L.		Buklo has not yet been surveyed.
			537·13 L.		
		150	96000 E. L.		The probable area which will be taken up as reserves.
		20·88	13583		Will soon be extended.
		15·09	9703		
·04	24·48	16·85	11107·66		Small plots given up for burning grounds and as near springs.
		5·79	3708		
		7·56	4847		
		38·43	24,600 E. L.		Represent the Deodár forest as estimated by the working plan. Other forest is however equally under our control.
		50·	32,000 E. L.		
		4·25	2793		All these areas will be changed on final settlement being made.
3	2075	331·00	211,724		Rukhs given up in Lahore.
		379·00	242,693		
		864·50	553,264		Under Settlement.
					Ditto.

FORM NO. 45.

Forest Department, Punjab.

Area of Unreserved Forests, during 1876-77.

Forest Division.	Name of District.	*Area on 1st April* 1876.		*Added during the year.*		*Excluded or transferred to other heads.*		*Total on 31st March* 1877.		No. and date of notification of addition.	Remarks.
		Square miles.	Acres.	Square miles.	Acres.	Square miles.	Acres.	Square miles.	Acres.		
Jhelum, ...	Hazárá, ...	11,30·30	7,23,293	...	...	...	...	11,30·30	7,23,293		These are "Guzara" or forests left for convenience of villagers.
Rawalpindi ...	Rawalpindi, ...	287·00	1,84,000	...	...	...	...	287·00	1,84,000		
Fuel Reserve North ...	Jhelum, ...	64	41,000	...	...	...	...	64	41,000		
	Shahpur, ...	905	5,79,000	...	...	...	...	905	5,79,000		
Fuel Reserve Central ...	Lahore, ...	...	...	...	...	...	...	...	...		Area cannot at present be stated till reserves are sanctioned.
	Montgomery, ...	...	...	...	...	...	...	...	...		
	Múltan, ...	...	...	...	...	...	...	...	...		
	Jhang, &c., ...	...	...	...	...	...	...	...	...		
Beás ...	Hushiarpore, ...	Not	known.								54 square miles in the Amb Tahsíl. In Dasuah not known.
	Kúlú, &c., ...	53	...	...	...	...	...	53	...		
	Kangra District, ...	537·42	3,43,949	...	...	...	...	537·42	3,43,949		The forests are in a general way under our orders except Kangra.

FORM NO. 46.
FOREST DEPARTMENT PUNJAB.
AREA OF PLANTATIONS DURING 1876-77.

EXPLANATION.— *I include under plantation, permanent gardens or nurseries, and bona fide areas planted, not portions of natural forests replenished or aided, but actual extensions of the existing area of forest.*

DIVISION.	NAME OF PLANTATION.	ON 1ST APRIL 1876.				DURING 1876-77.				ON 31ST MARCH 1877.			
		Area in acres.	Total cost.			Area added.	Total cost.			Total area.	Total cost.		
JHELUM ...	Péra Ghaib island (a)	412¾	...	...	...	11¾	...	...	...	424½	...	...	...
	Seila island ... (b)	182¼	...	...	...	...	...	...	...	182¼	...	...	...
	Khanpur Range (c)	...	...	...	...	81 Poles.	88	0	0	81 Poles.	88	0	0
	Dungagalli Range ...	66	2081	0	0	...	493	0	0	acres 66	2574	0	0
RAWULPINDEE ...	Ghoragalli forest garden,	½	42	0	0	...	...	...	...	½	42	0	0
NORTH BUKL RESERVE ...	Pubbi reboisement ...	150	2247	0	0	...	...	...	...	150	2247	0	0
	Gurát reboisement ...	10	185	0	0	...	...	...	...	10	185	0	0
CHENAB ...	... ...	...	...	...	...	...	...	...	...	...	...	...	...
RAVI ...	Dhauri (d)	25	not known.			...	...	...	...	25	...	...	...
	Basau ...	146	6670	0	0	...	...	...	...	146	6670	0	0
BEAS ...	Natishera island (e)	437·50	..	..	...	...	...	...	...	397·	...	...	...
	Chitril nursery ...	9·50	...	...	...	...	...	...	...	9·50	...	.	...
	Mohali Forest Garden ...	2·00	...	...	...	...	...	...	...	2·00	...	.	...
SUTLEJ ...	Nachár (f)	60·	564	0	0	...	...	...	...	60	564	0	0
	Sholtu (g)	6·50	559	0	0	...	...	...	...	6·50	559	0	0
	Rorung (h)	1·75	128	0	0	...	...	...	...	1·75	128	0	0
FUKL RESERVE CENTRAL,	Rode Shah by zemindárs,(i)	10	...	...	...	...	...	...	...	10	...	...	...
PLANTATION DIVISION,*	(a) Changa Mánga ...	8172	290,751	13	3	940	27,279	10	6	9112	3,18,031	7	9
	(b) Lahore Sailábs Jugian Shahdra and Mahmud Buti (l)	1200·50	18,404	9	10	...	1,412	2	9	1199	19,816	12	7
	Jhok and Sadhanwáli (m)	1181·50	15,539	15	8	145	3,680	2	7	1316·50	19,220	3	3
	(c) Outlying plots :—												
	Nág ...	412	28,072	4	1	...	618	4	5	412	28,690	8	6
	Jullundur ...	50·50	3,427	15	4	...	60	0	0	50·50	3.487	15	4
	Phillour ...	239	12.844	6	2	...	232	15	0	239	13.077	5	2
	Ludhiána ...	190	6.016	9	11	...	376	2	0	190	6,392	11	11
	Jagádhri ...	183·50	9,108	6	4	...	60	0	0	183·50	9,168	6	4
	Kothala (n)	26	19.454	15	5	...	406	11	3	...	19,861	10	8
	Thatta Fakírulla ...	393	3,193	9	9	...	87	8	0	393	3,281	1	9
	Carob plot ...	37	1,990	10	7	...	215	5	9	37	2,206	0	4
	(d) Bukh Improvement					...							
	Kikranwalla ...	576	1,246	15	8	...	389	8	6	576	1,636	8	2
	Experiments ...	...	811	3	0	...	10	3	11	...	821	6	0
	Baoli Lehna Singh (o)	...	...	...	...	100	5,350	2	3	100	5,350	2	3
	Kot Lakput ...	...	...	...	...	...	16	14	6	...	16	14	6
	Plantation Division expenditure ...	...	1,80,010	12	8	...	13,293	11	7	...	1.93.304	8	3
	Total ...	12,661	5,80,874	3	8	1185	53,489	7	1	13 808·50	6,34,363	10	9

(a) Total area of Seila is 698½ acres of which 182¼ are partly under trees *viz*, 83¾ acres forest land and 98¾ under cavalry, and 515¾ under grass and pilchi *viz*, 265¾ acres under Forest Department, and 250¾ made over to Cavalry

(b) This area now includes the *whole* of the cavalry land which is only very sparsely covered with trees. Total area of Péra Ghaib is about 857¾ Total *partly* under trees in 424½ acres *viz*, 296½ forest land and 128¾ belonging to cavalry. Total number of acres not planted is 426¾ out of which about 64¾ acres were lost by erosion during the year.

(c) The English trees planted in February last are in Karwáli.

(d) Both waste area planted in extention of natural foreste.

(e) No cost incurred in this Division, one of the early experiments : total cost not known : difference lost by diluvion.

(f) Hardly a plantation but a work for restoration of natural forest, it does not increase the *area* of the existing Nachar forest.

(g) An experiment made in the first years of the lease.

(h) This high cost is due to a long water course constructed available for a largar area of land.

(i) The same remark however applies as to Nachár.

(l) 1½ acres lost by erosion.

(m) 10 acres lost by erosion.

(n) Returned to owners, the original area operated on was 175 acres.

(o) A large proportion of expenditure is on account of operations for 1877-78 such as making nurseries ploughing land and for a contemplated plantation.

* *N. B.*—In this statement the expenditure incurred during the year under each plantation comprises charges (1) under A Conservancy and Working (2) Pay of Permanent Establishments. The expenditure under "Divisional Expenditure" includes pay of Gazetted Officers, Office Establishment and of Forest Rangers. Travelling Allowances and Contingent charges.

FORM NO. 48.

Prosecutions for breaches of Forest rules during 1876-77.

Forest Divisions and Civil Districts.	Injury to Forest by fire.		Unauthorized felling or appropriation of wood and minor forest produce.		Grazing without permission or in tracts in which grazing is prohibited.		Other offences.		Total.				Remarks.
									Prosecutions.		Convictions.		
	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	Cases.	Persons.	
Jhelum.													
Hazárá	20	34	84	223	53	144	30	69	187	470	136	227	"Other offences" 3 were of moving boundary pillars: one in which a whole village was concerned. Does not include cattle pounded.
Jhelam	...	...	20	28	1	1	...	...	21	29	19	27	
Rawalpindi.													
Rawalpindi	3	3	35	54	41	74	7	9	86	140	43	76	
Fuel Reserve Northern.													
Jhelám	...	...	26	37	3	10	1	1	30	48	20	31	
Gujrát	...	...	6	8	4	15	1	4	11	27	8	19	
Sháhpore	...	...	13	19	2	7	...	...	15	26	10	19	
Chenab.													
Chumba (Forest.)													
Gujrát } River.	...	...	4	4	...	..	...	...	4	4	3	3	
Sealkote } River.	...	...	2	2	...	...	...	...	2	2	2	2	
Gujránwalla } River.	...	...	1	6	...	...	1	1	2	7	2	7	
Ravi.													
Chumba (Forests) ...	2	3	16	39	...	...	...	...	18	42	14	37	
Gurdáspore } River	...	...	5	7	...	...	...	...	5	7	5	7	
Lahore } River	...	...	...	...	...	...	...	...	...	...	...	...	
Beas.													
Kulu Sub-District	1	1	5	7	...	...	...	...	6	8	3	5	
	2	not reported.	16	...	...	...	...	...	18	...	17	...	
Mandi State	...	...	9	9	...	...	...	...	9	9	8	8	
Kangrá	6	18	27	36	68	153	1	1	102	208	100	207	
Hushiárpore ...	...	...	11	15	1	9	1	1	13	25	13	25	
Amritsar	...	...	2	8	...	...	...	...	2	8	1	5	
Sutlej. ...	...	...	7	12	...	...	1	1	8	13	7	12	
Fuel Reserve Central.													
Amritsar	...	...	...	...	...	...	...	...	...	...	...	...	
Lahore	...	...	8	12	2	8	...	...	10	20	7	13	
Gujránwalla	...	...	5	6	1	2	...	...	6	8	1	2	
Montgomery	...	...	17	40	3	7	21	36	41	83	29	52	
Multan	...	...	8	12	3	5	2	2	13	19	13	19	
Muzuffergurh	...	...	3	6	...	..	3	4	6	10	6	10	
Dera Ghazi Khan ...	2	2	8	13	...	...	1	6	11	21	10	20	
Gurdáspore	...	...	1	4	...	...	...	...	1	4	...	...	
Plantation.													
Gujránwalla	...	...	...	...	...	...	1	1	1	1	1	1	
Lahore	...	...	3	3	1	1	...	...	4	4	4	4	Does not include cattle pounded.

Annual Form No. 49.—[*Prescribed.*]

FOREST DEPARTMENT, PUNJAB.

Summary of Revenue of the Different Divisions, 1876-77.

Budget Heads Receipts.	Direction.	Sutlej Division.	Beás Division.	Ravi Division.	Chenab Division.	Jhelum Division.	Rawul Pindi Division.	Fuel Reserve Central Division.	Fuel Reserve Northern Division.	Plantation Division.	Total.
I.—Timber and other produce removed from the forests by Government Agency :—											
a. Timber ...	...	85,166 13 6	32,538 13 10	46,525 11 4	65,184 0 4	65,907 11 8	...	..	...	...	2,95,323 2 8
b. Firewood and Charcoal ...	...	115 2 6	33 0 0	115 2 8	345 13 1	2,163 15 2	...	...	...	...	2,773 1 5
c. Bamboos ...	...	...	12,283 8 9	...	...	...	...	...	...	...	12,283 8 9
d. Sandal-wood ...	...	...	...	...	...	...	...	...	...	...	...
e. Grass and other Minor Produce,	...	...	1 4 0	...	..	...	...	...	...	...	1 4 0
II.—Timber and other produce removed from the forests by consumers or Purchasers :—											
a. Timber ...	...	4,907 10 8	2,847 13 10	458 0 0	...	6,665 0 0	2,349 0 0	...	...	...	17,227 8 6
b. Firewood and Charcoal ...	...	190 10 0	164 12 7	100 0 0	...	4,354 8 6	23,466 8 4	34,310 6 5	2,125 15 2	4,801 7 0	69,512 15 0
c. Bamboos ...	...	327 7 0	406 7 5	...	...	...	961 4 3	...	...	...	1,695 2 8
d. Grazing and Fodder Grass ...	...	272 2 3	4,167 1 5	...	...	4,134 1 1	4,120 1 7	1,06,610 0 7	55,483 10 8	6,145 15 6	1,80,933 2 1
e. Other Minor Produce ...	...	...	439 15 3	...	...	588 7 3	...	861 15 3	113 5 0	2,082 15 7	4,086 10 4
III.—Confiscated, drift, and waif wood ...	...	...	2,032 6 0	...	6 8 0	7 10 0	...	...	...	...	2,046 8 0
IV.—Revenue from forests not managed by Government :—											
a. Duty on Foreign Timber and other Forest Produce ...	...	...	...	...	...	...	...	...	...	...	..
b. Revenue from Shared and Private Forests ...	...	...	442 1 6	...	...	...	...	...	...	...	442 1 6
V.—Miscellaneous :—											
a. Fines and Forfeitures ...	...	6 0 0	718 5 3	148 7 3	43 0 3	143 0 0	49 1 6	86 9 1	25 8 0	17 12 4	1,237 12 1
b. Refunds ...	...	1,050 8 0	...	672 12 10	529 2 9	...	...	1,717 6 5	12 12 3	773 9 1	4,756 3 4
c. Other Sources ...	...	116 2 0	157 7 0	20 3 0	1,257 3 3	315 14 7	529 8 0	680 13 4	1,683 15 2	1,673 12 6	6,434 14 10
Total Receipts ...	...	92,152 8 11	56,233 0 10	48,040 5 1	67,365 12 1	84,278 15 3	31,475 7 8	1,44,267 3 1	59,445 2 3	15,495 8 0	5,98,753 15 2

Dated _____

The _____ *18* .

Wm. RIGHY,

Offg. Deputy Conservator.

Annual Form No.

FOREST DEPART-

SUMMARY OF EXPENDITURE OF THE

BUDGET HEADS. A.—CONSERVANCY AND WORKS.	Direction.			Sutlej Division.			Beás Division.		
I.—TIMBER AND OTHER PRODUCE REMOVED FROM THE FORESTS BY GOVERNMENT AGENCY :—									
a. Timber	...	...	...	28,581	2	11	13,458	15	5
b. Firewood and Charcoal	...	...	...	...	...	...	418		0
c. Bamboos	...	...	...	...	...	...	3,505	13	9
d. Sandal-wood	...	...	...	...	...	...	...	...	...
e. Grass and other Minor Produce	...	...	...	24	0	0	...	...	...
II.—TIMBER AND OTHER PRODUCE REMOVED FROM THE FORESTS BY CONSUMERS, OR PURCHASERS	...	...	...	...	...	...	261	12	6
III.—CONFISCATED, DRIFT AND WAIF WOOD	...	...	...	1,100	0	0	20	7	9
IV.—REVENUE FROM FORESTS NOT MANAGED BY GOVERNMENT :—									
a. Duty on foreign timber and other forest produce,	...	...	...	...	...	...	...	...	...
b. Revenue from shared and private forests	...	...	...	...	...	...	...	...	...
V.—RENT OF LEASED FORESTS AND PAYMENTS TO SHAREHOLDERS IN FORESTS MANAGED BY GOVERNMENT	...	...	...	6,386	0	0	...	...	...
VI.—LIVE AND DEAD STOCK :—									
a. Purchase of cattle	...	...	...	...	...	...	...	...	...
b. Feed and keep of cattle	...	...	...	84	6	9	...	...	...
c. Plant, tools and instruments	...	...	...	...	...	...	182	15	11
VII.—COMMUNICATIONS AND BUILDINGS :—									
a. Roads and Bridges	...	...	...	1,168	8	1	504	1	3
b. Buildings	...	...	...	595	15	9	761	5	2
c. Other Works	...	...	...	128	0	0	125	15	8
VIII.—DEMARCATION, IMPROVEMENT AND EXTENSION OF FORESTS :—									
a. Demarcation	...	...	...	13	0	0	46	13	9
b. Compensation for Land and Rights	...	...	...	85	0	0	29	9	0
c. Surveys and Working-Plans	...	...	...	337	9	2	...	...	...
d. Plantations	...	...	...	...	...	...	44	7	1
e. Protection from Fire	...	...	...	1	8	0	7	8	0
f. Other Works	...	...	...	...	...	...	1,288	1	10
IX.—MISCELLANEOUS :—									
a. Refunds	...	...	...	...	...	...	...	...	...
b. Law Charges	191	2	3	...	...	...	4	0	0
c. Other Charges	...	...	...	...	...	...	2	8	0
TOTAL, A.—CONSERVANCY AND WORKS	191	2	3	38,505	2	8	20,199	4	1
I.—SALARIES :—									
a. Conservators	16,707	4	1	...	...	...	...	...	...
b. Superior Officers	5,535	7	9	16,100	0	0	11,753	1	1
c. Subordinate Forest and Depot Establishments	129	0	0	4,283	14	8	9,653	11	0
d. Office Establishments	7,447	15	0	953	8	0	1,284	11	10
e. Deputation and Special Allowances	...	...	...	...	...	...	...	...	...
II.—TRAVELLING ALLOWANCES :—									
a. Conservators	1,931	1	0	...	...	...	...	...	...
b. Superior Officers	905	0	0	3,728	12	6	1,703	0	0
c. Subordinate Forest and Depot Establishments	25	3	6	679	15	10	1,913	11	0
d. Office Establishments	1,240	8	11	228	1	7	635	9	5
III.—CONTINGENCIES :—									
a. Stationery	119	14	0	20	12	6	106	9	9
b. Carriage of tents and records	313	0	1	382	4	3	407	10	4
c. Pay of Police Guards	...	...	...	18	0	0	...	...	...
d. Sundries	959	9	7	1,144	11	5	765	5	9
e. Official Postage	426	3	0	89	3	6	318	6	6
TOTAL, B. ESTABLISHMENTS	35,740	2	11	27,629	4	3	28,541	21	8
GRAND TOTAL OF EXPENDITURE	35,931	5	2	66,134	6	11	48,741	0	9

DATED, DALHOUSIE,
The 14th September 1877.

49.—[*Continued.*]

MENT, PUNJAB,

DIFFERENT DIVISIONS, 1876-77.

Ravi Division.			Chenáb Division.			Jhelum Division.			Rawul Pindi Division.			Fuel Reserve Central Division.			Fuel Reserve Northern Division.			Plantation Division.			TOTAL.		
36,297	14	10	17,077	14	10	46,215	1	0	...	...	...	...	...	...	...	...	...	...	...	...	1,41,631	1	0
...	...	...	60	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	64	14	5
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3,505	13	9
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	260	2	6	61	10	0	...	...	...	345	12	6
...	...	...	...	...	...	664	3	11	537	0	0	8,629	1	5	5	0	0	...	...	...	10,097	1	10
...	...	...	112	2	0	7,524	7	11	...	...	...	...	...	...	...	...	...	...	...	...	8,757	1	8
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	21,000	0	0	8,078	1	0	...	...	...	...	...	...	...	...	...	...	...	...	35,464	1	0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	359	0	0	359	0	0
...	...	...	...	...	...	...	...	...	...	...	...	15	0	0	...	...	...	194	10	8	294	1	5
152	6	8	25	6	9	2,695	6	7	106	5	0	351	12	9	56	3	8	1,012	10	3	4,583	3	7
209	0	6	171	1	3	2,165	8	2	399	3	0	...	...	...	...	...	...	...	...	...	4,617	6	3
832	8	4	384	6	1	2,058	13	9	598	13	2	494	9	3	123	6	11	461	10	2	6,311	8	7
46	0	0	702	15	5	2,717	4	5	...	...	...	...	...	...	5	10	0	...	...	...	3,725	13	6
87	5	0	...	...	...	1,416	0	1	96	7	0	1,986	12	2	66	8	6	218	13	0	3,931	11	6
...	...	...	74	9	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	189	2	6
...	...	...	...	...	...	...	...	...	...	...	...	3,122	5	9	992	13	6	...	...	...	4,352	12	5
...	...	...	...	...	...	...	...	...	489	10	2	...	...	...	...	...	...	31,166	11	5	31,700	12	8
...	...	...	...	...	...	130	0	0	...	...	...	6	3	0	...	...	...	...	...	...	145	3	0
1,427	10	11	...	...	...	493	4	3	...	...	...	576	0	0	3,082	2	7	2,571	13	3	9,389	0	10
3	0	0	...	...	...	...	...	...	...	...	...	166	8	0	360	14	6	...	...	...	530	6	6
...	...	...	...	...	...	4	8	0	10	0	0	56	0	0	...	...	...	60	12	0	326	6	3
...	...	...	...	...	...	...	...	...	...	...	...	4	11	7	...	...	...	...	...	...	7	3	7
39,055	14	3	39,608	9	3	74,162	11	1	2,237	6	4	15,669	2	5	4,654	5	8	36,046	0	9	2,70,329	10	9
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16,707	4	1
6,733	15	7	6,164	8	2	11,509	14	6	4,661	4	8	13,061	4	7	5,189	8	2	6,761	4	8	87,470	5	2
7,582	5	4	5,572	0	6	5,090	0	0	6,450	1	1	20,427	10	1	9,783	0	1	5,202	10	7	75,174	5	4
1,590	0	0	2,214	6	8	1,593	5	9	436	4	7	1,665	0	0	878	1	0	1,600	9	0	19,663	13	10
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,931	1	0
2,270	9	3	1,404	6	9	4,163	9	0	1,066	0	0	3,246	9	6	1,434	4	6	2,423	10	10	22,345	13	10
1,400	3	11	1,242	8	10	692	0	1	1,142	0	2	1,311	11	7	1,082	14	11	745	12	8	10,289	2	6
534	7	11	292	9	9	597	9	10	118	11	0	263	2	9	353	7	1	222	1	3	4,476	5	6
106	8	3	128	11	3	75	3	9	118	15	0	317	0	3	137	7	6	107	4	3	1,238	6	6
372	11	3	456	7	6	540	5	9	185	9	3	278	10	0	373	10	7	19	6	6	3,329	11	6
...	...	...	332	5	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	350	5	11
121	11	4	714	13	6	906	8	9	224	4	4	546	3	10	1,036	5	9	436	4	7	6,858	14	10
166	10	0	397	6	5	184	8	0	132	14	8	320	7	3	231	11	0	102	11	0	2,370	1	4
20,882	2	10	19,920	5	3	25,348	1	5	14,536	0	9	41,437	11	10	20,500	6	1	17,621	11	4	2,52,152	11	4
59,938	1	1	59,528	14	6	99,505	12	6	16,778	7	1	57,106	14	3	25,154	11	9	53,667	12	1	5,22,482	6	1

WM. RIGHY,

Offg. Dy. Conservator of Forests, Punjab.

Annual Form No. 50.—[*Prescribed.*]

FOREST DEPARTMENT, PUNJAB.

Account Current for the year 1876–77.

Dr.

To Cash Balance on 1st April 1876		...	...	...	25,252	8 9
„ Revenue received in Cash	Sutlej Division,	81,697	14	3		
	Beás „ ...	55,958	0	10		
	Ravi „ ...	26,343	2	6		
	Chenáb „ ...	44,055	10	1		
	Jhelum „ ...	82,541	8	3		
	Rawul Pindi „ ...	31,475	7	8		
	Fuel Reserve Central „ ...	1,38,131	6	6		
	Ditto Northern „ ...	58,087	4	9		
	Plantation „ ...	15,495	8	0	5,33,785	14 10
„ Revenue Adjusted by Book Transfer	Public Works Dept. ...	23,049	1	11		
	State Railways ...	35,141	6	11		
	Military Dept. ...	4,065	5	5		
	Bháwúlpur State ...	2,712	2	1	64,968	0 4
„ Remittances from State Treasuries	...	...	...	...	5,18,753	12 1
„ Remittances by transfer from other Dept.	Govt. of India ...	477	10	0		
	Public Works Dept. ...	2,476	14	10		
	Military Department ...	551	1	6		
	Jail Do. ...	574	9	6	4,080	3 4
„ Govt. North Western Provinces	...	...	...	...	24	10 0
„ Contributions to Funds	Uncovenanted Service Family Pension Fund,	2,823	8	0		
	Bengal Military Fund ...	346	8	0		
	Civil Fund ...	563	0	0		
	Madras Military Fund ...	537	9	0	4,270	9 0
„ Advances Recoverable	...	...	...	...	11,027	8 4
„ Cash Recoveries of Service payments	...	...	...	...	12,163	10 9
„ Chumba State	...	...	...	...	7,154	12 8
		TOTAL		...	11,81,481	10 1

Cr.

By Expenditure under A	Sutlej Division...	43,640	10	7		
	Beás „ ...	20,203	4	10		
	Ravi „ ...	40,864	12	0		
	Chenáb „ ...	40,596	2	5		
	Jhelum „ ...	77,337	1	10		
	Rawul Pindi „ ...	2,237	6	4		
	F. R. Central „ ...	15,670	10	5		
	Do. Northern „ ...	4,654	6	0		
	Plantation „ ...	36,077	3	4		
	Direction „ ...	191	2	2	2,81,472	12 6
„ Expenditure under B	Sutlej „ ...	27,914	11	9		
	Beás „ ...	28,549	4	8		
	Ravi „ ...	20,882	2	10		
	Chenáb „ ...	20,007	15	3		
	Jhelum „ ...	25,344	6	2		
	Rawul Pindi „ ...	14,563	1	9		
	F. R. Central „ ...	41,440	2	1		
	Do. Northern „ ...	20,502	14	1		
	Plantation „ ...	17,634	7	7		
	Direction „ ...	36,334	2	2	2,53,173	4 4
„ Revenue Remittances State Treasuries		...	...	...	5,31,085	2 5
„ Do. adjusted by book transfer		...	...	...	64,968	0 4
„ Advances Recoverable		...	...	...	12,066	8 11
„ Refunds		...	...	...	801	14 6
„ Govt. North Western Provinces		...	...	...	350	0 0
„ Cash Balance on 31st March 1877		...	...	...	37,563	15 1
		TOTAL		...	11,81,481	10 1

DATED DALHOUSIE,
The 14th September 1877.

WM. RIGHY,
Offg. Dy. Conservator of Forests, Punjab.

Annual Form No. 51.—[*Prescribed*].

FOREST DEPARTMENT, PUNJAB.

Statement of Outstandings and Liabilities on account of Contractors, 1876-77.

Division.	Department Debtor.				Department Creditor.				Balance due.			Remarks.
	At commencement of year.	Recoveries in cash and value of supplies and work done during the year.	At close of year.		At commencement of year.	Payments made during year.	At close of year.		To Department (Outstandings)	By Department (Liabilities.)		
Sutlej ...	...	13,481 11 6	13,481 11 6		1,130 0 0	12,476 11 6	13,606 11 6		125 0 0	...		Charged to C. & Working
Do. ...	...	475 4 4	475 4 4		...	475 4 4	475 4 4		...	...		do. „ A Recoverable
Beás ...	...	3,811 10 10	3,811 10 10		10,600 0 0	8,771 14 4	19,371 14 4		15,560 3 6	...		do. „ C & Working
Do. ...	...	2,260 2 6	2,260 2 6		998 2 6	1,262 0 0	2,260 2 6		...	...		do. „ A Recoverable
Ravi ...	342 8 11	35,450 14 9	35,793 7 8		3,960 11 10	33,940 14 1	37,901 9 11		4,459 3 3	2,351 1 0		do. „ C & Working
Chenáb ...	...	1,459 3 4	1,459 3 4		484 6 0	1,119 9 6	1,603 15 6		144 12 2	...		do. „ do.
Do. ...	...	48 15 9	48 15 9		18 15 9	30 0 0	48 15 9		...	...		do. „ A Recoverable
Jhelum ...	...	650 12 8	650 12 8		...	3,850 12 8	3,850 12 8		3,200 0 0	...		do. „ C & Working
Do. ...	2,100 0 0	163 0 4	2,263 0 4		2,291 5 9	2,249 4 0	4,540 9 9		2,277 9 5	(*b*).		do. „ A Recoverable
Fuel Reserve Central	...	6,686 15 11	6,686 15 11		7,998 4 10	500 0 0	8,498 4 10		1,811 4 11	...		do. „ C & Working
Ditto ...	...	10 3 10	10 3 10		73,859 14 6	...	73,859 14 6		73,849 10 8	(*a*).		do. „ A Recoverable
Fuel Reserve Northern	...	499 0 2	499 0 2		1,716 10 0	...	1,716 10 0		1,217 9 10	..		do. „ C & Working
Ditto ...	...	6,887 8 1	6,887 8 1		7,210 1 4	1,363 0 0	8,573 1 4		1,685 9 3	...		do. „ A Recoverable
Plantation ...	...	6,154 12 11	6,154 12 11		...	7,624 12 11	7,624 12 11		1,470 0 0	...		do. „ C & Working
Do. ...	...	200 0 0	200 0 0		378 0 0	200 0 0	578 0 0		378 0 0	...		do. „ A Recoverable
Direction ...	...	6,477 0 0	6,477 0 0		174 15 5	6,487 0 7	6,662 0 0		185 0 0	...		do. „ do.
Total ...	2,442 8 11	84,717 4 11	87,159 13 10		1,10,821 7 11	90,351 3 11	1,91,172 11 10		1,06,363 15 0	2,351 1 0		

(*a*).—Of this amount Rs. 73,500, is on account of Secunder Khan's outstanding.
(*b*).—This amount 2,277-9-5 is the deficiency caused by Sookdyal in the Jhelum Frauds case.

Dated Dalhousie,
The 14th September 1877.

Wm. Righy,
Offg. Dy. Conservator of Forests, Punjab.

Annual Form No. 52.—[*Prescribed*].

FOREST DEPARTMENT PUNJAB.

Statement of Outstandings on account of Revenue, 1876-77.

Division.	Particulars.	Outstandings at commencement of year.			Value of sales and other revenue during year.			Total.			Amount realized during year.			Balance due to the Department at end of year.			Remarks.
Sutlej ...	Timber, firewood and Bamboos ...	4,571	12	0	90,967	11	8	95,539	7	8	90,707	11	8	4,831	12	0	Since written off.
	Grazing and fodder and Grass ...	...	...	...	272	3	3	272	3	3	272	3	3	...	...	...	
	Miscellaneous ...	...	...	...	1,172	10	0	1,172	10	0	1,172	10	0	...	...	...	
Beas ...	Timber, firewood and Bamboos ...	3,796	2	2	50,307	14	5	54,104	0	7	50,325*	14	5	3,778	2	2	* Rs. 19 clerical error.
	Grazing and fodder Grass ...	...	...	...	4,167	1	5	4,167	1	5	4,167	1	5	...	...	...	
	Miscellaneous ...	...	...	...	1,759	1	0	1,759	1	0	1,759	1	0	...	...	...	
Ravi ...	Timber and firewood ...	a 5,599	2	0	51,829	2	9	57,628	4	9	47,216	1	0	10,212	3	9	Rs. 1,128 since written off.
	Miscellaneous ...	...	...	...	824	4	1	824	4	1	824	4	1	..	...	...	
Chenab ...	Timber and firewood ...	7,253	15	0	65,536	8	11	72,790	8	11	65,536	8	11	7,253	15	0	
	Miscellaneous ...	...	...	...	1,829	3	2	1,829	3	2	1,829	3	2	...	...	...	
Jhelam ...	Timber and firewood ...	3,525	10	0	76,380	6	4	79,906	0	4	79,097	8	4	808	8	0	Since recovered.
	Grazing and fodder Grass ...	54	0	0	4,080	1	1	4,134	1	1	4,134	1	1	...	...	...	
	Miscellaneous ...	...	...	...	1,047	5	10	1,047	5	10	1,047	5	10	...	...	...	
Rawul Pindi ...	Timber, firewood and Bamboos ...	...	...	...	26,776	12	7	26,776	12	7	26,776	12	7	...	...	...	
	Grazing and Grass ...	...	...	...	4,120	1	7	4,120	1	7	4,120	1	7	...	...	...	
	Miscellaneous ...	...	...	...	578	9	6	578	9	6	578	9	6	...	...	...	
Fuel Reserve Central	Grazing and Grass ...	b 13,370	0	0	1,10,708	10	8	1,24,078	10	8	1,06,610	0	7	17,468	10	1	
	Firewood and Charcoal ...	4,862	12	0	31,996	10	7	36,859	6	7	34,310	6	5	2,549	0	2	
	Miscellaneous ...	1,019	0	0	4,038	3	1	5,057	3	1	3,346	12	1	1,710	7	0	
Do. Northern,	Grazing leases ...	c 17,263	9	8	53,050	12	8	70,314	6	4	55,483	10	8	14,830	11	8	
	Firewood ...	...	...	...	2,125	15	2	2,125	15	2	2,125	15	2	...	...	...	
	Miscellaneous ...	...	...	...	1,835	8	5	1,835	8	3	1,835	8	3	...	...	...	
Plantation ...	Thinnings and Grass / Other sources ...	827	14	9	16,460	5	2	17,288	3	11	15,495	8	0	1,792	11	11	
	Total ...	62,143	13	7	6,01,865	3	4	6,64,009	0	11	5,98,772	15	2	65,235	10	9	

(*a*) Erroneously shown as 2208 at opening of year by Divisional Officer.
(*b*) Do. do. 18017 do. do. do.
(*c*) Not recorded do. do. do.

Dated Dalhousie,
The 14th September 1877.

Wm. RIGHY,
Offg. Dy. Conservator of Forests, Punjab.

FORM NO. 53.

FOREST DEPARTMENT PUNJAB,

Statement of the trees felled during the year 1876–77.

Division.	Forest Range.	Locality.	Description of trees.	No.	Cubic feet.	How disposed of.	Remarks.
Jhelum ...	Kaghan ...	Súka khás ...	*C. D.*	500		Converted into logs.	
		Bunja khás ...	"	113		"	
		Dhannu ...	"	387		"	
		Various forests,	" (dead) ...	313		"	387 trees remained unlogged.
Do. ...	Dungagalli Range,	Dungagalli ...	*P. Excelsa*	130		Sold standing	
			Do. dry	18		"	
			Elm *V. Wallichiana* ...	10		"	
			P. Longifolia	48		"	
			A. Webbiana	285		"	
			Do. (dry) ...	68		"	
			Quercus Dilatata	6		"	
			Q. Incana	49		"	
			H. Chestnut (*Sculus indica*) ...	60		"	
			Prunus padus	64		"	
			Maple (*A. Casium*)	22		"	
			Celtis	53		"	
			Fothergilla	15		"	
			Cedrela, Serrata	5		"	
			Cotoneaster	10		"	
			Yew	1		"	
Rawalpindi ...	Hill forests ...	Various ...	*Pinus Longifolia*	401		Cut by order of Forest Officer.	
			Dead Do.	354		"	
			P. Excelsa	1		"	
			Q. Incana	334		"	
			Acacia Modesta	46		"	
			A. Catechu	17		"	
			Pistacia Integerrima ...	4		"	
			Olea Europea	118		"	
			Cornus Macrophylla ...	12		"	
			Various Species	47		"	
			Cedrela Surrata	7		"	
	Murree ...	Various ...	Pines (P. L. & E.) ...	1,171		Cut by order of Tehsildars &c.	
			Shisham	129		"	
			Other trees	42,116		"	
			Pines	202		"	
	Kahuta ...	Various ...	Other trees	5,527		"	

Division.	Forest Range.	Locality.	Description of trees.	No.	Cubic feet.	How disposed of.	REMARKS.
Chenáb ...	Tindi ...	Various ...	C. D.	48		Converted into logs.	
			Pines	248		,,	248 had been felled last year & left.
			Pencil Cedar	15		,,	
	Purti ...		C. D.	76		,,	
			Walnut	20		,,	
	Sanch ...		C. D.	69		,,	
			Ash	10		,,	
	Kilar ...		C. D.	70		,,	
	Darwas ...		C. D.	66		,,	
Ravi ...	Kalatop ...	Various ...	C. D.	44		Sawn into scantlings ...	For Dalhousie.
			A. S.	27		Do. ...	Station supply.
	Suil ...	Diúr ...	C. D.	200		Logged for export ...	No. of logs not stated.
	Bagota ...	Khás nal ...	C. D.	50		,,	
	Bassu ...	Thakur bani ...	C. D.	50		,,	
	Baklo ...	,,	P. L.	114		Locally sold and removed.	
Beás ...	Upper Beás ...	Dhasgi ...	C. D.	112	11,200	Sawn up into scantling for export.	For Government Export and by Government agency.
		Sandhar ...	C. D.	271	27,100		
	Parbati ...	Khobas ...	P. E.	63	3,780	Logged for export.	
	,, ...	,, ...	C. D.	28	1,120	Do.	
	Upper Beás ...	Manáli ...	C. D.	136	6,800	Do.	
	Kulu generally,	Cannot be specified chiefly unreserved forest	C. D.	108	6,480	For Civil Works.	
			C. D.	10	600	For Public Works.	
			C. D.	34	2,040	For Temples.	
			C. D.	2	80	For cutting into torches.	
			C. D.	123	6,060	For Zemindar's houses.	
			C. D.	1	60	Sold to townspeople.	
			P. E.	123	7,380	For Civil Works.	
			P. E.	2	120	For Public Works.	
			P. E.	17	1,020	For Temples.	
			P. E.	6,999	4,19,940	Zemindar's houses.	
			P. E.	119	7,140	Sold to townspeople.	
			Other pines	68	4,080	Civil Works.	
			,, ...	7	330	For Temples.	
			,, ...	4,503	2,70,380	Zemindar's houses.	
			,, ...	2	120	Sold to townspeople.	
			Other trees	482	10,750	For various purposes.	
	Hushiárpore ...	Lohara, ... Do. & Panjal,	P. L.	28	1,400	Sold standing.	
			Sal poles	2,938	...		
	Núrpur ...	Various,	P. L.	174	8,700	,,	
			Miscellaneous	551	12,080		
	Dera and Hamírpore,	Various,	P. L.	644	14,746		
			Miscellaneous	202	1,408		
Sutlej ...	Bussahír ...	Tikru, Nachár, Kilba,	C. D.	1,340	...	Converted into logs for export.	

Supplement to Form No. 53.

STATEMENT OF MINOR PRODUCE AND FUEL.

Kind of Produce.	Jhelam.		Rawalpindi.		Northern Fuel Reserve.		Central Fuel Reserve.		Bias.		Sutlej.		Plantation.	
	Quantity or number.	Value Rupees.	Quantity or number.	Value Rupees.	Quantity or number.	Value Rupees.	Quantity or number.	Value Rupees.	Quantity or number.	Value Rupees.	Quantity or number.	Value Rupees.	Quantity or number.	Value Rupees.
			Maunds.		Maunds.		Cubic feet.							
Fuel ... Dry wood ...		3,876	2,22,986			1,032								
Fuel ... Green " ...			28,600		3,067	132	18,06,699	33,190						
Fuel ... Brush " ...			1,96,717		10,964	658								
Fuel ... &													20,577 Mds. 9,231 Stems 9,529	4,801
Grazing and sale of grass ...	...	4,080	...	4,120	...	50,453	...	11,4,535	...	...	...	...	...	6,146
Munj or grass for ropes &c. ...	...	...	...	...	...	44	...	1,265	...	...	...	...	...	...
Kunkur &c. ...	...	...	...	...	...	401	...	246	...	...	...	...	...	...
Sajji or Soda &c. ...	...	...	...	...	...	40	...	691	...	...	...	...	...	...
Cultivation ...	...	...	...	...	...	...	...	1,580	...	...	...	...	...	2,083
Dye Stuffs and gums ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lime and Surkhi Kilns ...	...	...	178	...	...	...	...	...	...	...	...	...	...	...
Bamboos ...	...	...	14,221	961	...	...	...	...	H. 7,99,051 K. 71,525	...	...	...	...	...
Charcoal ...	...	...	...	...	...	...	...	4,106	...	...	...	...	...	...
Wood for small industries. *Vitex* for Basket making...			405 loads											
Wood for small industries. Roofing pieces ...			3981		484	117								
Wood for small industries. Plough " ...			3879		343	12								
Wood for small industries. Wood for Combs ...														
Wood for small industries. Walking sticks ...			5358											
Wood for small industries. Palm leaves for mat work,						101								
Wood for small industries. Shisham poles ...					700	700								

FORM NO. 54.

FOREST DEPARTMENT PUNJAB.

Statement of logs, Sleepers and other scantlings cut and exported during the year 1876-77.

Division.	Forest Range.	Locality.	Description of timber and scantling.	On hand from previous year.		Cut during current year.		Total.		Disposed of during current year.			Closing balance.		Remarks.
				No.	C ft.	No.	C ft.	No.	C ft.	How disposed of	No.	C ft.	No.	C ft.	
Jhelum	Kaghán	Bunja khás Suka khás	Deodar	4260	...	7170	...	11430	...	Launched.	7155	...	4275	...	
Chenáb	Pángi	Tindi	Deodar (dry)	1846	18,460	220	2,200	2066	20,660	Do.	2066	20,660	...	...	
			Do. windfalls	430	4,300	200	2,000	630	6,300	Do.	630	6,300	...	...	
			P. excelsa	...	...	1400	14,000	1400	14,000	Do.	116	1,160	1284	12,840	
		Púrti	Deodar (dry)	2534	25,340	267	2,670	2801	28,010	Do.	2801	28,010	...	...	
			Do. windfalls	1087	10,870	1410	14,100	2497	24,970	Do.	2497	24,970	...	...	
			Walnut	...	...	78	780	78	780	Do.	78	780	...	...	
		Sánch	Deodar (dry)	667	6,670	747	7,470	1414	14,140	Do.	1414	14,140	...	...	
			Do. windfalls	3034	30,340	617	6,170	3651	36,510	Do.	3651	36,510	...	...	
			Ash	...	...	17	170	17	170	Do.	17	170	...	...	
		Tindi	Pencil cedar	...	...	20	200	20	200	Do.	20	200	...	...	
		Kilar	Deodar (dry)	...	...	318	3,180	318	3,180	Do.	318	3,180	...	...	
			Windfalls	52	520	411	4,110	463	4,630	Do.	463	4,630	...	...	
		Darwás	Deodar (dry)	...	...	235	2,350	235	2,350	Do.	235	2,350	...	...	
			Do. windfalls	...	...	630	6,300	630	6,300	Do.	630	6,300	...	...	
Ravi	Kálatop	Kálatop	Deodar scantlings	141	76·67	1494	2,034·56	1635	2,111·23	Sold ...	1181	1,534·81	153	194·77	
										used by Dept.	301	381·65			
			A Smithiana	1247	1,680·63	2074	484·08	3321	2,164·71	Sold ...	1834	1,885·64	707	1,155·32	
										used by Dept.	780	908·30			
			Oak scantlings	557	484·08	...	...	557	484·08	Sold	4	12·99	553	471·09	
Upper Ravi Sub-Division	Síul	Bhándal	Deodar logs	324	...	...	...	324	...	...	...	...	324	...	
	Do.	Diúr	...	...	...	1160	...	1160	...	...	...	...	1160	...	
	Tisa	Bagota	...	949	...	350	...	1299	...	Launched	1110	...	189	...	

Beás	Kúlú	Solang forest	Walnut logs	385	1,925	...	...	385	1,925	Launched	385	1,925	...	...	
		"	Maple "	288	1,440	..	...	288	1,440	Do.	288	1,440	...	...	
		Dhaogi	Deodar scantlings	...	...	4586	13,758	4,586	13,758	Do.	...	...	4,586	13,758	
		Sandhár	Do.	...	...	7972	23,916	7,972	23,916	Do.	...	...	7,972	23,916	
		Khobás	Kail logs	...	...	402	4,020	402	4,020	Do.	402	4,020	...	...	
			Deodar logs	...	...	57	1,140	57	1,140	Do.	57	1,140	...	...	Cut from dead trees
		Monáli forests	Do.	...	...	611	6,110	611	6,110	Do.	611	6,110	...	...	Do. windfalls
Sutlej	Bassáhír	Tikrú, Nachár, Kilba	Deodár	...	...	6760	...	6,760	...	Launched	5528	...	1,232	...	
		Various	Windfall Deodár	...	...	4485	...	4,485	...	Do.	4485	...	...	...	
			Kail (P. E.)	...	...	968	...	968	...	Do.	968	...	...	...	
			Deodár logs left from Messrs. Brassey's works.	...	...	602	...	602	...	Do.	602	...	...	...	
							...		...			...		...	

DATED DALHOUSIE,

The 14th September

Annual Form No. 55.—[*Prescribed.*]

FOREST DEPARTMENT PUNJAB.

Statement of Timber and other produce brought to depôt from the different Forest Divisions, 1876-77.

Division.	Forest.	Description of Timber, &c.	No. of Pieces.	No. of Cubic feet	Total of each Division. Pieces.	Total of each Division. Cubic feet	Remarks.
Sutlej ...	Basahir ...	1st Class Deodar,	...	...	6,823	1,32,897	
Beás ...	Upper Beás ...	...	...	...	907	38,932	
Ravi ...	Various ...	...	...	...	3,685	83,655	
Chenáb ...	Pangi ...	...	...	...	9,544	1,24,576	
Jhelum ...	Kagán ...	...	...	...	142	5,332	
	Total ...				21,101	3,80,392	
Sutlej ...	Basahir ...	2nd Class Deodar,	...	...	5,147	47,191	
Beás ...	Upper Beás ...	...	...	...	834	7,536	
Ravi ...	Various ...	...	...	...	2,400	22,052	
Chenáb ...	Pangi ...	...	...	...	7,053	47,311	
Jhelum ...	Kagán ...	...	...	...	844	12,585	
	Total ...				16,278	1,36,675	
Sutlej ...	Basahir ...	Pine logs,	...	...	814	10,467	
Beás ...	Parbatti ...	...	...	...	1,322	22,280	
Ravi ...	Upper Ravi ...	...	...	...	4,048	49,798	
Chenáb ...	Pangi ...	...	...	...	2,792	29,465	
Jhelum ...	Kagán ...	...	...	...	1,827	16,997	
	Total ...				10,803	1,29,007	
Sutlej ...	Basahir ...	Deodar Scantlings,	...	...	260	689	
Beás ...	Seoráj ...	Sleepers 6× 8×4	44	58	...	...	
Do. ...	Do. ...	Do. 9×10×5	36	101	...	...	
Do. ...	Do. ...	Beams 13× 9×5	52	211	...	...	
Do. ...	Do. ...	Do. 6× 8×8	10	27	...	...	
Do. ...	Do. ...	Do. 10'	1	3	...	...	
Do. ...	Do. ...	Do. 21× 7×7	1	7	144	407	
Ravi ...	Kálátope ...	Scantlings,	1,494	2,034	...	...	
Do. ...	Do. ...	Do. (pine)	2,074	2,269	3,568	4,303	
				Total ...	3,972	5,399	
Sutlej ...	...	Scraps and pieces,	...	...	4,362	...	
Beás ...	...	...	...	...	383	...	
Ravi ...	...	...	...	...	4,321	...	
Chenáb ...	...	...	...	...	3,516	...	
Jhelum ...	...	...	...	...	218	...	
Fuel Reserve ...	...	...	...	...	13,925	...	
	Total ...				26,725		
		Fancy Woods.					
Sutlej ...	Kalesur ...	Sal poles,	...	...	2,342	...	
Beás ...	Parbatti ...	Box Wood,	16	17	...	...	
Do. ...	Solang ...	Walnut,	1	2	17	19	
Ravi ...	Suil ...	Olive,	...	...	16	41	
Chenáb ...	...	Tun,	1	6	...	...	
Do. ...	...	Walnut,	8	81	...	...	
Do. ...	...	Ash,	7	54	...	...	
Do. ...	...	Pencil Cedar,	17	226	33	367	
	Total ...				2,408	427	
		Miscellaneous.					
Ravi ...		Charcoal,	...	...	1,283	...	Maunds.
Fuel Reserve ...	Gurdáspore ...	Do.	...	...	4,149	...	Do.
Do. ...	Do. ...	Chil Tar,	...	...	25	...	Do.
Beas ...	Hoshiárpore and Dhumtal in Kangra	Bamboos,	...	...	8,12,529	...	

Dated Dalhousie, *The 14th September 1877.*

Wm. RIGHY,
Offg. Dy. Conservator of Forests, Punjab.

Annual Form No 56.—[*Prescribed.*]

FOREST DEPARTMENT, PUNJAB.

Account of Timber and other produce 1876–77.

Particulars.	Pieces.		Total.	
	No.	Cubic ft.	No.	Cubic ft.
Balance in hand at Commencement of year.				
Deodár in log ...	22,337	3,15,702		
Pines in log ...	4,307	80,906		
Scantlings of sorts ...	4,501	8,206	31,145	4,04,814
Scraps and pieces ...	18,410	...	18,410	
Charcoal, maunds ...	12,913	...	12,913	
Received during the year.				
Deodár in log ...	37,379	5,17,066		
Pines in log ...	10,803	1,29,007		
Scantlings of sorts ...	3,972	5,399		
Fancy Woods ...	2,408	427	54,562	6,51,899
Scraps and pieces ...	26,725	...	26,725	
Charcoal, maunds ...	5,432	...	5,432	
Total ...	...	...	1,49,187	10,56,713

Particulars.	Pieces.		Total.	
	No.	Cubic ft.	No.	Cubic ft.
Removed by Purchasers.				
Deodár in log ...	34,656	4,87,520		
Pines in log ...	8,870	1,33,500		
Scantlings of sorts ...	5,680	10,115		
Fancy Woods ..	2,358	41	51,564	6,31,176
Scraps and pieces ...	39,141	...	39,141	
Charcoal, maunds ...	14,206	...	14,206	
Lost or used by the Department.				
Deodár in log ...	376	7,074		
Pines in log ...	14	236		
Scantlings of sorts ...	1,356	1,669	1,746	8,979
Scraps and pieces ...	1,400	...	1,400	
Balance at close of year.				
Deodár in log ...	24,684	3,38,174		
Pines in log ...	6,226	76,177		
Scantlings of sorts ...	1,437	1,821		
Fancy Woods ...	50	386	32,397	4,16,558
Scraps and pieces ...	4,594	...	4,594	
Charcoal, maunds ...	4,139	...	4,139	
Total ...	...	...	1,49,187	10,56,713

Dated Dalhousie,
The 14*th September* 1877.

Wm. RIGHY,
Offg. Dy. Conservator of Forests, Punjab

FORM NO. 57.

FOREST DEPARTMENT PUNJAB,

Statement showing the amount **realized** *on account of the different classes of timber and other produce sold from Depots during* 1876–77.

Division.	Description of Timber &c.	No. of pieces &c. sold.	Cubic contents.	Amount realized and due on account of sales.			Average amount per log, &c.			Average cubical contents of logs.	Average amount per cubic foot.			REMARKS.
Sutlej ...	Deodár ...	10,891	1,54,928	74,975	10	11	6	15	5	14·23	0	7	10	The average of 14·23 cubic feet accounted for by sales including both 1st and 2nd Class logs mixed.
	Pines ...	594	8,774	2,525	14	0	4	4	0	14·77	0	4	7	
	Sleepers ...	260	689	327	14	5	1	4	2	2·65	0	7	7	
	Sál Kurries ...	3,149	...	3,329	12	6	1	1	7	...	...	...	...	
	Scrap wood ...	3,955	...	2,627	15	0	0	10	7	...	...	...	...	
	Firewood ...	406	...	115	2	6	...	...	...	...	...	...	...	
Beás ...	Deodar ...	801	24,922	21,732	4	8	27	4	11	31·11	0	14	0	The large average of 31·11 is arrived at by sales being only for *picked* 1st Class logs.
	Pines ...	1,348	22,537	5,601	5	9	4	2	5	16·71	0	3	11	
	Deodar sleepers ...	1,435	5,718	4,816	0	6	3	5	8	3·98	0	13	5	
	" broken pieces ...	394	718	233	13	0	0	9	5	1·82	0	5	2	
	Chil sleepers ...	37	49	13	14	0	0	6	0	1·33	0	4	6	
	Firewood ...	34	149	33	0	0	0	15	6	4·38	0	3	6	
	Bamboos ...	3,06,021	...	12,283	8	9	15-0-0 per 1000			...	...	...	...	
	Other Minor Produce ...	...	...	1	4	0	...	...	...	...	...	...	...	
Ravi ...	Deodar logs 1st Class ...	2,225	51,366	43,146	15	2	19	7	0	25·78	0	12	3	This average 25·78 is also for picked 1st Class logs only.
	Do. " 2nd " ...	386	5,153	2,116	13	4	5	7	9	13·35	0	6	7	
	Pines ...	421	6,100	1,788	13	6	4	4	0	14·49	0	4	8	
	Deodar scantlings ...	1,181	1,535	1,569	2	0	1	5	0	1·29	1	0	4	
	Tos Do. ...	1,838	1,898	938	13	5	0	8	3	1·004	0	7	11	
	Olive ...	16	40	142	12	11	8	14	10	2·54	3	8	3	/8/-per cubic foot & carriage estimated at 5 cubic feet per piece per maund.
	Unmeasured pieces ...	2,984	14,920	1,477	12	0	0	7	11	5·00	0	1	7	
	Firewood ...	Mds. 880	...	72	13	4	...	...	...	...	0	1	4	
Chenáb ...	Government Deodár ...	14,104	1,33,165	62,744	10	2	4	7	2	9·44	0	7	6	Average 9·44 is for mixed logs.
	Purchased Deodár ...	14	694	433	12	0	30	15	8	49·47	0	10	0	This high average 49·47 is for *strictly selected* logs purchased some years ago.
	Pines ...	1,431	9,909	1,952	10	2	1	5	10	6·92	0	3	1	
	Sleepers ...	59	...	53	0	0	...	...	...	...	...	...	...	
	Firewood ...	1,663	...	345	13	1	...	...	...	...	...	...	...	
Jhelum	Deodár ...	7,369	1,46,383	50,531	8	5	6	13	8	19·85	0	5	6	This is a good average for "mixed logs," but are chiefly 1st Class ones.
	Pines ...	5,848	95,860	12,328	3	3	2	1	8	16·39	0	2	0	
	Firewood ...	...	...	2,163	15	2	...	...	...	...	...	...	...	
	TOTAL ...	8,69,744	6,85,457	3,10,424	15	11								
	Deduct amount due but not realized during the year ...			6,577	15	2								
	Balance ...			3,03,847	0	9								
	Add amount realized on account of former years ...			6,534	0	1								
	Total shewn as revenue on account of sale under Budget Head I.			3,10,381	0	10								

DATED DALHOUSIE,
The 14*th September* 1877.

WM. RIGHY,
Offg. Dy. Conservator of Forests, Punjab.

FORM NO. 58.

FOREST DEPARTMENT PUNJAB.

Statement showing the amount **expended** *on the different classes of Timber and other produce brought to Depôt during* 1876-77.

Division or Depôt.	Particulars of Timber &c.	No. of Pieces.	No. of Cubic contents	Expenditure. Timber expenses under A. I.	Expenditure. Quota of all other expenditure chargeable against Timber &c.	Expenditure. Total amount chargeable against Timber &c.	Average. Amount per piece.	Average. Cubic contents per piece.	Average. Amount per cubic foot.	Remarks.
Sutlej ...	Deodár ...	11,970	1,80,088	27,990 5 0	34,985 14 3	62,976 3 3	4 13 3	15·71	0 5 3	This amount is the amount per cubic foot arrived at by total charges under A. I. and quota of B. under timber expenses.
Do. ...	Pines ...	814	10,467							
Do. ..	Scantlings ...	260	689							
Do. Kalesur...	Sál poles ...	2,342	...	595 12 1	2,525 3 9	3,118 15 10	1 5 4	...	... ...	
Beas ...	Deodár ...	1,741	41,468	13,458 15 5	20,042 12 11	33,501 12 4	10 7 0	20·00	0 8 4	This amount 0/8/4 is arrived at by the total of charges under A. I. and a 4/5/0 of other expenditure under B. which Colonel Stenhouse, consider the fair proportion chargeable to timber expenses during the year.
	Pines ...	1,322	22,280							
	Scantlings ...	143	403							
	Bamboos ...	8,12,529	...	3,505 13 9	5,220 13 5	8,726 11 2	10 11 10	per 1,000	... ...	
Ravi ...	Deodár ...	6,546	1,23,525	36,855 13 1	12,632 11 7	49,488 8 8	5 2 0	17·49	0 4 4	Ditto.
	Pines ...	3,027	43,929							
Chenab ...	Deodár ...	16,597	1,71,887	14,859 1 9	12,000 0 0	28,810 14 5	1 7 0	10·33	0 1 9	This amount 0/1/9 per cubic foot is a small average expenditure compared with the other rivers but is probably accounted for by a great proportion of the timber receipts in Depôts (being though received during this year), really chargeable to former year's expenses incurred on same.
	Pines ...	2,792	29,465	1,951 12 8						
Jhelam ...										
Behree Depôt...	Deodár ...	953	16,576	39,510 4 1	10,745 3 0	50,255 7 1	10 15 2	18·86	0 9 3	A fair proportion of expenditure under B. added to charges under A.
Baghám Do. ...	Deodár and Pines,	2,102	53,902							
Behree Do. ...	Pines ...	1,535	16,096							
	Total ...	8,64,678	7,10,775	1,38,725 13 10	98,152 10 11	2,36,878 8 9				

Dated Dalhousie,
The 14th September 1877.

Wm. RIGHY,
Offg. Dy. Conservator of Forests, Punjab.

FORM NO. 60.

Abstract showing the value of Timber and of Live and Dead Stock for the year 1876-77.

Description of Timber and other Stock.	On hand at commencement of the year.		Received during the year.		Total.		Sold otherwise disposed of and lost during the year and allowance for depreciation.		On hand at close of the year.		Cause of loss and other particulars.
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	
Timber (cubic feet)	4,04,814	2,67,647 0 0	6,51,472	4,33,500 0 0	10,56,286	7,01,147 0 0	6,40,114	3,16,843 0 0	4,16,172	3,84,304 0 0	Deodár valued at 12 annas per cubic feet. Scantling or sorts @ 8 per cubic feet.
Fancy wood (No.) ...	...	...	2,408	2,408 0 0	2,408	2,408 0 0	2,358	2,358 0 0	50	50 0 0	Pines ... ... @ 5-4 per cubic feet.
Broken pieces &c. (No.) ...	No. 18,410	3,682 0 0	26,725	5,345 0 0	45,135	9,027 0 0	40,541	8,108 0 0	4,594	919 0 0	Pieces ... ... @ 20 0 0 per °/₀. Charcoal @ 1 0 0 per maund. Fancy wood @ 1 0 0 per piece.
Charcoal (maunds).	Maunds. 12,913	12,913 0 0	5,432	5,432 0 0	18,345	18,345 0 0	14,206	14,206 0 0	4,139	4,139 0 0	Ditto ditto. Timber lost by floods valued @ Rs. 6,497 0 0.
Live and Dead Stock. (As per divisional statements)	...	74,556 0 0	...	18,111 0 0	...	92,667 0 0	...	4,541 0 0	...	88,126 0 0	The details of timber shown by total of cubic feet may be seen in Form 56.
Total ...	...	3,58,798 0 0	...	4,64,796 0 0	...	8,23,594 0 0	...	3,46,056 0 0	...	4,77,538 0 0	

Note.—Difference in value at commencement and close of the year Rs. 94,865-0-0 in favor of the year, allowing for depreciation at 5 per cent.

The form does not deal with timber in transit and not yet realized.

Wm. RIGHY,

Offg. Dy. Conservator of Forests, Punjab.

Dated Dalhousie,
The 14th September 1877.

DISTRICT AND CANAL ARBORICULTURE, 1876-7.

(Being an Appendix to the Forest Report of the year.)

INTRODUCTORY.

Only a very few District Arboriculture Reports for 1875-76 were received—so few that it really was not worth while to abstract them in my Report for that year. Still fewer came from the Canal Department. Officers did not seem to be aware that the reports were required. Consquently this year (1876-7) is the first for which I have been able to prepare a report.

2. I must however specially ask that, in future, reports may reach me by June 1st at latest: this year my report was otherwise delayed, so that I was able to include local reports which dropped in, even in August; but this will not be possible next year.

3. I shall be much obliged if every officer, whether District or Canal, will, for the puposes of this Annual Report, invariably state the income and expenditure. Under the latter, it should be possible without trouble to give separately:—Expenditure on (1) Establishments (2) Maintenance of existing work and (3) Expenditure on the years' new work.

4. All statements should invariably show what has been done during the year; if it is wished to show what has been done *previously*, this information should be given in a separate column, so that no mistake can occur. In some cases, returns were headed "during the year," which would seem to include all work done in the district in previous years as well.

5. Reference is also invited to various remarks on *Eucalyptus*. The importance of distinguishing between tropical species and temperate, is very great, so that attempts to grow the latter in the plains (except *perhaps* close under the hills) should not be made. The importance of noting with care the species sown, and place wherein the seed was obtained, is equally great, as then it is known what species succeed, and waste of money in getting wrong kinds of seed is prevented.

6. As regards district planting, the idea that I put forward in 1871, about drawing up 5 years' plans for each district seems on the whole not to have answered. A good many plans were indeed received, and some in great detail (as from Ludhiana, Ambala, and Gujranwalla); others also were sent during my absence, and appear to have been approved and returned, so no detail of them exists in this office: but I have not been able to learn that such designs for work were kept to. Perhaps, it was found that with much other work in hand it was not possible to accomplish the year's proposal, or perhaps the planting did not succeed, and there were not the means, afterwards, to do both the work of the year and that which had failed before.

7. So that I have not thought it desirable, now the five years have ended, to suggest a renewal of the scheme. But the basis of the idea was a right one, and though no formal plan with statements be made out, it is essential that the work should not be desultory, but that the District officer should make up his mind beforehand what is to be done; each year make his budget accordingly, and be satisfied that the work is really accomplished.

8. In some reports, I regret to notice a return to the old fallacious mode of *counting* trees—"8,000 trees were put out during the year," is a remark I have respectfully reproduced, *but it means nothing*—whereas if it is related that the year's work "consisted in the planting of groves round four Government buildings:—the tahsil compound A—the Police station B—the Parao C—the village school houses D—which were planted with groups of Shisham about 30' at each place; and four miles of road from A. to B. were planted on both sides at 15 feet apart, and the last account shows that they were successful, with only occasional failures: that three nurseries of 1 kanál each for supply of plants for future works were sown at D. B. X. as good positions," then the progress made is at once appreciated and we do not suspect its accuracy.

9. The worse the soil and the more difficult the work, the more restricted the extent should be. Each Tahsildar should then be permitted only to do such limited work as he can really tend and watch, till it is finally out of danger. It is not possible for officers in Sirsa, to plant as those in Hushiarpur can.

10. I beg to suggest to officers dealing with bad soil, to grow Pipal trees in *pots*, till they are four feet high, and then put them out: the pots often require to be broken so as not to disturb the roots. A tree will often take in this way—when smaller plants fail, or (in case of other species) get trampled or browsed by passing cattle.

11. When Bhistis are necessary, it is said that water can be very much economized for individual trees in places where it is very desirable to rear them, by burying the largest obtainable gharra in the ground up to its neck close to the tree, and filling it occasionally with water: the moisture slowly evaporates through the porous vessel and keeps the soil slightly moist much more persistently than a lot of water poured on once a day, by a Bhisti does.

Peshawar.

12. 114,729 trees of sorts were planted out on district roads in the following tahsils:—

Pesháwar	... 60,000
Nowshera	... 2,700
Mardán	... 7,069
Otshán Balak	... 4,310
Hashtnaggar	... 25,338
Doaba Daudzai	... 15,312
	114,729

13. The sum of Rs. 16,218 was expended, and the following staff is maintained:—

1	Jemadar on	...	Rs.	12	per mensem.
5	Do.	...	„	10	„
1	Do.	...	„	9	„
3	Do.	...	„	8	„
2	Do.	...	„	7	„
5	Do.	...	„	6	„
17					

14. The large number of 205 gardeners and water-carriers costing (@ 5 Rs. each) 12,900 for the year, was maintained. 32 Kutcha wells were sunk at a cost of 527 Rs. Seedlings to value of Rs. 407 were purchased, and Rs. 460 were spent on keeping 8 buffaloes at the Murdán well. These with minor items which need not be detailed, make up the sum of Rs. 16,218.

15. It does not appear that any of this expenditure relates to the Jhíl plantation, the funds for which were supplied by this Department. A very brief report on this has shown that very little success has been attained. The result of the sowing of the large quantity of *Eucalyptus, viz* $3\frac{1}{16}$ lb of *E. Emarginata* and $1\frac{1}{2}$ of *E. Globulus* has resulted in only about 156 plants, of what species is not stated. I have asked for further particulars.

Kohat.

16. The Executive Engineer undertook the planting. But the District is very unfavourable. 141 trees were planted on the Hazára road, and 366 on the Bannú road. There are some young Shísham trees on the Mir Khweli hill, which might be increased.

Hazara.

17. The roads in the District Officer's charge are available wholly or partly for planting are from:—

Harípúr to Khánpúr, 16 miles; the soil is bad and trees difficult to rear. The road is properly dealt with by small sections; along $1\frac{1}{2}$ mile, 650 trees were put, out of which 191 died.

Abbottabad to Dhobighát, 2 miles. This is beautifully planted. Gums (*Eucalypti*) thrive here. A special letter has been written to the Deputy Commissioner asking him to send branches of the trees, with flower or fruit for correct identification.

Mansera to Shinkiári. 1,316 trees planted with success.

18. There are two Municipal gardens (17 acres and 4 acres respectively) in the Haripur Municipality full of fruit trees, and supplying also nursery plants. Mango trees, it is curious, will not thrive there; they grow to a certain age and die off before fruit-bearing. The Nawáshahr Municipality planted 188 trees on the old road to Thandiáni.

Abbottabad itself is full of trees of all kinds. There is also a nursery garden (25 acres). 1,000 trees were planted around the various thannahs and buildings.

The Bálákot thanna has an excellent garden, which I had an opportunity of examining. *Pinus excelsa* grows well here, although the elevation must be below 3,000 feet. Pines should *never* be pruned or lopped, as some of these were.

19. I also suggest that all blanks should be filled up on the road out of Abbottabad towards Mansera. *Anything* will here grow; and wherever there is over much moisture, a Willow or two will keep up the line. When grown up, a most beautiful and interestingly varied avenue will be obtained, and it is a pity to allow any blanks in it.

Rawalpindi.

20. A list of 26 roads is given, which may be abbreviated as follows :—

			Miles.	
(Attock)	Gondul to Hazro	...	... 8	All taken in hand for replenishing blanks in previously made avenues on both sides of the road along the distance named.
(Fatteh Jang)	Fatteh Jang to Kálábagh		... 1	
(Gujar Khan)	Padhana to	Gujar Khan	... 7	
„	Bewal „	Lahawa	... 2	
„	Chakrali „	Dangally	... 2	
„	Kazián „	Gujar Hill	... 12	
„	Narali „	Bewal	... 3	
„	Chagga „	Kazián	... 1½	
„	Padhana „	Do.	... 1½	
„	? „	Gujar Khan	... 10	
„	Mandra „	Turkwal	... 21	
„	Bhehut „	Gujar Khan	... 15	
„	Sukho „	Saora	... 6	
„	Taragarh „	Sukho	... 4	
„	Jatti „	Tamora Ahir	... 3	

Pindi Gheb. Pindi Gheb to Makhad, to Jand, to Pind Sultáni to Fatteh Jang and to Kot Malyáran, each one mile planted.

			Miles.	
(Kahúta).	Kallar to	Owen ferry	... 18	Blanks in these distances replenished.
„	„ „	Dangalli	... 12	
„	„ „	Rewat	... 8	
„	Mangtura to	Bhut	... 1	
„	Kallar to	Salgráon	... 19	

21. Groves are also reported to have been made.

Road Gondul to Hazro ...		Grove on 1 Kanál of 300 Sissú and 300 Mulberry.				
Do. Shanshabad to Hazro...		Do.	do.	do.	do.	
Fatteh Jang to Kálábagh ...		Grove of 3 marlas, Sissú and Olive.				
Pindi Gheb „ Kalabagh	... 10	Groves of 1 kanal each, Shísham, Kikar, and Mulberry.				
Do. „ Makhad	... 9	Do.	do.	do.	do.	
Do. „ Jand	... 12	Do.	do.	do.	do.	
Do. „ Pind Sultáni	16	Do.	do.	do.	do.	
Do. „ Fatteh Jang...	10	Do.	do.	do.	do.	
Do. „ Kot Malyárán	10	Do.	do.	do.	do.	

At Kahúta Khas 3 Groves of 343 mango trees each.

Road for Kahúta to Kallar. 2 groves planted with 300 Shísham trees and sown also for nursery purpose.

22. Nothing is said of expenditure : if all this work was done *during* 1876, as distinctly stated, and has succeeded, very great activity has been displayed.

Jhelam.

23. Captain Hutchinson says the great want is nurseries : but if it can be afforded to sink a well, nothing is easier than to make a nursery, and it is certainly desirable to defer planting out road till a good supply of strong well grown trees is available for transplanting.

24. The district returns do not show the work of the year separately from that previously done, which is to be regretted. Thus from a table (showing how well on the whole arboriculture has been cared for) of 33 roads in the district, all more or less planted, I gather that the year's work has been to plant a nursery garden at Choya Saidan Shah : for roads,—that from Choya Saidan Shah to Kallar Kahár (17 miles) has had 11 miles planted with Shísham at 15 feet apart ; also 2 miles of the road from the same place to Bishárat. The road from Kallar Kahár to Futtehgang (2 miles) was also planted with Shísham.

SHAHPUR.

25. Expenditure Rs. 1,182. The trees employed are Kíkar, Shísham, Mulberry and Bór (and one I cannot make out). 2,011 trees were planted on the Civil Station roads, encamping grounds at Shahpur and Jhawarián, and on the Lahore and Sahíwál road. On the latter road nurseries have been made, aggregating 10 begahs, which have already reared 5,000 plants.

In tahsíl Khusháb the following trees were planted :—

500—Kund and Khusháb road.
340—Sakesar road.
200—Sakesar Tank.
2,900—In Sún Iláka.
300—Encamping ground at Mittha Tiwána.

In tahsíl Bhéra, 3,000 trees were planted on Bhéra and Bádsháhpur road, on the banks of the Raniwali Canal, and at the tahsíl and Police Station.

Nurseries were made on the Wazírí and Bádsháhpur roads in which 7,000 seedlings have germinated.

26. I beg to call attention of the Deputy Commissioner to the danger of lopping.

The officer in charge of the Forests in this district informs me that he saw the avenue (a fine one) from Sháhpur to Miáni nearly ruined by lopping. He saw gangs of villagers, armed with all kinds of weapons cutting off large branches (quite unnecessarily) leaving ends a foot long. Small trees also which should not have been touched, were stripped of all but two or three top branches. In no case should the persons set to lop be allowed to take the loppings in return for their labor, or they are sure to over do it.

GUJRAT.

27. Expenditure Rs. 992, chiefly on the road from Gujrat to Bhimbar, formerly quite bare. Six miles of this road have been dealt with, the first two with Shísham in avenue, and the other four with Kíkar sowings. This is successful. A branch leading from the Grand Trunk road at Kathála to the approach of the bridge of boats, was planted with a double avenue of Shísham. Various blanks in other roads have been filled up.

BANNU.

28. The expenditure is not stated. The work was chiefly maintenance and filling up gaps. The best avenue in the district is on the road from Kohát to Dera Ismail Khan through Edwardesabad. It is said that on the road to Mirian and the Jani Khel post, the avenues have been extended. Also that a number of "Australian trees" have been raised. It would be interesting to know what species and where the seed came from. Shaikbudeen is certainly more likely to answer for them than the plains, unless the Deputy Commissioner is sure he has tropical not temperate species to sow.

29. *Dera Ismail Khan.*—Report not received.

Dera Ghazi Khan.

30. The operations in this District are described in the following abstract :—

Name of road.	No. of trees planted.	Distance planted.	Remarks.
			All these roads were planted about 30 feet apart in single rows, one each side of the road.
Koreshi Ferry road ...	400	A little over a mile from about the 2nd mile to the water's edge.	Shísham.
Main Dera Ismail Khan road	350	About a mile making in all 2 miles planted.	Do.
Road leading from Station to Junction with Dera Ismail Khan road	300	About ¾th of a mile ...	Do.
Road to Sakhi Sarwar,	550	A mile and a half making in all about 2 miles planted.	Shísham and Kikar, the latter where the land is impregnated with Kullur.
Rajanpur Road ...	510	Nearly a mile and a half from 7th to about half way between 8th and 9th mile.	Shísham.
Sheru Road ...	510	About a mile and a half from the 1st to half way between the 2nd & 3rd mile.	Shísham.

2 road-side nurseries on Sakhi Sarwar road one near station, the other about 2 miles out.
2 on the Rajunpur road, one near the 4th mile stone, the other near the 8th.
1 on the Koreshi Ferry road.
1 on the Sheru road about 2 miles away from the station.
1 on the Dera Ismail Khan road, about a mile and a half out of the station, and the plantation in the Kotla Sikháni rukh.

Road-side trees are watered by Bhisties from October to April, and by canal water by means of drains from April to September. The entire cost of planting, maintaining road-side trees and nurseries, and getting up the plantation at Kotla Sikháni during the year, amounted to about Rs. 1,500.

31. It is satisfactory to notice that a plantation has been commenced in the Kotla Sikháni rukh, 5 miles from the Sadr Station. The nursery commenced has many thousands of Shísham and Kikar, which will be ready for planting out in February. The Deputy Commissioner will find transplanting Kikar, possible, but requiring *great* care.

Muzaffargarh.

32. The expenditure was Rs. 2,945; of this however Rs. 307 was spent on replacing old bullocks for well work, and Rs. 240 was paid to the Agri-Horticultural Society as subscription; the establishment costs Rs. 1,500 and Rs. 48 were spent in keep of cattle.

Of 2,572 trees planted, 2,350 are said to be successful, about half were put out at camping grounds and the rest along roads. The main roads from Sadr Station to Rangpur, Khangarh, Sitpur and Sanawan, have benefitted this year, and some of the station roads also, while new trees have been added to the grove at the Sadr encamping ground and Cutcherry.

There are 2 nurseries in the Telehri garden being especially well situated for supervision. The Deputy Commissioner reports that his predecessor tried to interest

School Masters and others, so that schools and other such buildings might have trees planted to shade them. Major Harrington has not yet had any opportunity of seeing how this has answered.

33. The services of Mr. Allsop, District Superintendent Police, are commended in connection with the Arboricultural work.

MULTAN.

34. The expenditure is not stated, and the report is contained in a tabular form, which shows a successful establishment of 7,811 trees out of 8,401 planted. Of these, 3,041 were in nurseries; so that about 5,000 trees were planted out in 5 tahsils, in 16 different roads and localities.

The land owners along the roads water the trees planted, receiving Rupees 12-8 per hundred per annum.

JHANG.

35. An interesting report on this difficult district is furnished by Major Harcourt. The expenditure for the year was Rs. 4,320, but it is explained that it is necessarily an expensive matter to raise the trees in this district. 894 trees were put out on road sides and 2,263 in gardens or groves.

The roads leading to the Sadr Station have been systematically examined, planted up, and gaps filled where necessary.

36. I do not however quite understand the figures. It is said that 200 trees cost Rs. 400 to rear (should be 420.)

		Rs.
Thus :—	Cost of bullocks, ...	40
	Cost of feed of bullocks and wages of 2 men for 2 years, ...	360
	Contingencies, ...	20
	Total Rs., ...	420.

I quite understand that trees require individually watering, but whether it is meant that one well and bullocks can only water a length of road which contains 200 trees, or an area of ground on which 200 trees can be planted in a group, is not clear.

37. A nursery has been started at Jhang and the old one at Karora, too far off for supervision, abandoned. In the new nursery, 700 Bôr (Banyan) cuttings, 1,500 Shisham and 300 Siris trees have been established, besides a great variety of fruit trees and roses.

Gardens have been laid out at the Shorkot and Chiniôt tahsils.

38. The loppings of trees fetched Rs. 200 by sale, but I trust that this most dangerous process will be carefully watched: the havoc made by this work, unless done with saws or *sharp* tools for smaller branches, is terrible. I beg every officer to remember M. DeCourval's aphorism;—"Better a thousand times not to prune a tree at all, then to give it over to inexperienced hands."

39. Bér trees are said to be unsightly as they loose their leaves and remain naked and ugly all the summer. I wonder if this is the case with the *grafted* Bér, which about Lahore, &c., has a fine shade and large leaves *all* the year.

Shisham does very well at Jhang and coppices well: stout posts of green Shisham put in as supports were found to take root and grow.

The *phuláhi* is said to grow well, but I am inclined to think that the tree meant must be the *Rerú* of other Southern districts (*Acacia leucophlœa*) rather than the phuláhi (*A. modesta*) of Gujrat, Rawalpindi, &c.

MONTGOMERY.

40. A number of fruit trees, costing Rs. 216-6-11, were obtained from the A. H. Society and put out in the garden at the Sadr Station. In the station also 6,585 trees were put out. Rather more than 50 per cent of these succeeded.

On the frontier mail cart-road, 125 trees were planted at the Dográwala well, and 150 trees at Kamálin. 150 trees were put out at Chichâwatni dâk bungalow.—5,000 tamarisk cuttings were planted on road sides during the rains.

In Pákpatan tâhsíl, 575 trees were planted on the Sutlej customs line, and 610 in Bába Khem Singh's property.

In Gugaira tahsíl, 700 trees on the road between Gugaira and Syadwalla, and 100 trees between Gugaira and Okára, and some more near a tank at the Okára dâk-bungalow.

In Depálpúr, 8 miles of the road between Okára and Fazilka were planted. Rs. 306 were spent for allowance to cultivators for watering trees.

Lahore.

41. Expenditure not stated. A list of 11 roads treated during the year, is given :—

1.—Mian Mír to Hariki (16 miles)	...	From 1—6½ miles planted at 15 feet.
2.—Chúnian to Viran (20 miles)	...	From 19th to 20th mile.
3. Do. to Changa Manga (7)	...	300 trees to replenish along the whole.
4. Do. to Dhakú (9)	...	One mile at 15 feet apart.
5. Do. to Wán-W-Ram (14)	...	Ditto.
6.—Singhwala to Chûnian (13)	...	682 replenishing from mile 1—9.
7.—Patti to Pohwind (12)	...	A few to replenish.
8.—Kasúr to Khen Karn (6)	...	From mile 2—5 @ 15 feet apart.
9.—Khém Karn to Patti (25)	...	The 1st mile with 963 trees.
10.—Rajghat to Bachhoke	...	Replenishing by 175 trees from mile 13—17.
11.—Sharkpur to Shekhopura	...	From 2nd to 3rd mile @ 12 feet apart.

Ferozpur.

42. A list of sixty patches of ground (including encamping grounds) is given—which, "have been, are being, or might be" planted. There are also 18 district cutcha roads, and 7 pukka ones. Farásh cuttings are used, and trouble is repaid if 5 *per cent succeed.* The cuttings are planted in February. This I should have thought was not so favorable a time as the rainy season: and if the season is a fair one, a larger percentage of success ought to be attained. The sum spent was Rs. 6,168 but the report does not say what places were planted or work done during the year; this cannot be called satisfactory.

Gujranwalla.

43. 31,937 trees were planted out at a cost of Rs. 3,100, and private individuals planted 40,000. Zaildars and lumberdars are in charge of sections of the country as regards planting works, and the Tahsíldars make quarterly inspections. I would suggest the reckoning of work by localities and length of road *actually stocked.* A general total of trees planted 'somewhere' is rarely correct, and does not give any idea of progress if it is.

Amritsar.

44. Merely gives a list of species. 3,621 trees of kinds were planted, where, or at what cost, is not said.*

Sialkot.

45. The sum expended was Rs. 4,941, of this Rs. 717 went in maintaining several nurseries which now contain 4,00,000 young plants of various kinds. Nearly 50,000 young trees have been planted out, of which about 4,000 are reported to have failed. The chief localities of this planting were :—

	Rs.
Jammú road—cost	621.
Saidpur „	117.
Damthál to Nárowál	543.
Killa Sobhá Sing to Panjgaraon	112.
Dagri and Zafrwál road	318.
Bajwát road	164.

In various other roads replenishing of gaps was effected.

In this district return "frosa" (farásh) is called "weeping willow," it should be *Tamarix articulata*, tamarisk. 150 Eucalypti are also noticed. It is a pity that some details are not given about these interesting species, regarding which information is so much wanted.

GURDASPUR.

46. At the Kutcherry, the mango tope is being increased slowly and steadily as is to be desired. 60 trees were added in 1875 and 18 in 1876.

The Municipality have an avenue of mangoes of 107 trees from 13′—16′ high (maintenance cost Rs. 90) and there are 2 nurseries kept in Gurdáspur itself, one for mangoes and the other for other trees. There are 4,525 cuttings doing well (mangoes). Near the Kutchery compound, a grove of 140 Tun trees is being raised. A large number of trees were put out to fill blanks in the roads in Gurdáspur tahsíl.

47. In the Batala tahsíl the following roads were planted :—

Batala and Dera Nának,	...	475	Mulberry,	Shísham and Jaman.
Batala and Sri Gobindpúr,	...	855	do.	do.
Batala to Wazír-ki-puttan,	...	722	do.	do.
Batála and Aliwál,	...	122	do.	do.

The Municipal 'circular road' was also planted with 178 trees.

48. In the Pathánkot tahsíl the following trees :—

		Planted.	*Success.*
Shahpur and Pathánkot road	...	90	55
Pathánkot to Madhopur	...	770	440

49. In the Shakargarh tahsíl the following :—

Road from Shakargarh to Núrkot	...	810	710
Do. do. to Chanaol	...	500	?
Do. Kotnainá to Ikhláspur	...	200	?
Do. Nurkot to Doda	...	1,230	?

These 3,540 trees, cost Rs. 310.

Besides these nurseries in Gurdáspur itself, a nursery is kept up in each tahsíl.

50. The general expenditure is not stated, which is a pity, as the report is otherwise very satisfactory.

KANGRA.

51. The expenditure was Rs. 788. For this sum 9,014 trees were planted, of which 6,112 succeeded. I noticed that in Kúlú (especially towards Sultanpúr) a great deal of the planting had been done, but it seemed in many cases that trees had been planted by rule, and often it happened that the hole was made close to a place where a good tree was already growing; this is a pity. But a greater evil was that the trees put in were not preserved. If it is worth while to plant a tree, it is worth while keeping it safe from cattle, till it is strong enough to take care of itself. Great care also is necessary to put hardy trees in poor soil. The common wild Apricot and the Willow succeeded better, I noticed, than any other class of way-side trees in Kúlú.

HUSHIARPUR.

52. The establishment was considerably enlarged and a permanent staff put on to watch and tend the planted roads, &c., till old enough to be safe. One Máli is allotted to every 3 miles of road-side plantation.

53. In the fine soil and climate of this district the best trees can be grown. Tun and Shísham are grown largely, and this should always be kept in mind, because every tree cut afterwards when too old, or cut too thin out groves, &c., will sell for a good price. On the other hand, *Ficus cordifolia* and such like umbrageous trees are very desirable, where there is any temptation to the people to cut or lop the tree; for their wood being useless they will escape destruction.

54. Mr. Coldstream speaks of raising quantities of India Rubber and Eucalyptus: this is very satisfactory and it is hoped that great attention will be paid to the vital distinction between temperate Eucalypti (*E. globulus, viminalis, stellulata*, stringy bark, &c.,) and the tropical or sub-tropical, *E. rostrata, marginata, paniculata, &c.*, the latter will succeed in the plains, the former in the higher ground. In intra-montane valleys the temperate species will succeed even at low elevations, but then they are *surrounded* by higher mountain

atmosphere which makes all the difference (*Vide* Indian Forester for October 1876 page 120, &c.) This is why I made a remark about the 150 trees of *Eucalyptus* in Amritsar. If officers will only ask for *tropical* species when they wish to plant out in the plains, we may soon have our good soiled districts, like parts of Amritsar, Gurdáspur, Hushiárpur, Kangra, and Hazara, full of these valuable trees. Every inch of waste ground, ravine bank, &c., in the Pakli plain in Hazára might be covered with these trees.

55. A list of 44 different roads is given, * which appear to have been judiciously managed. All of these were not dealt with during the year. Indeed, I do not understand whether in every instance the "length planted" means, the length planted already, perhaps previously, or the length planted during the year ; if it alludes only to the year, then a total of 141½ miles has been planted and very judiciously. The distances selected for the trees are 10′, 15′, 20′, and 30′, according to soil and species. The best trees are cultivated at the greatest distance when success is safe, and the less distance adopted, where there is more chance of a certain number failing. Poor but hardy trees are grown where the success of finer kinds is doubtful.

56. All that is wanting to this report is a note on the expenditure.

57. I think the attention of Government should be invited to the very intelligent attention given, and the success attained in the matter of Arboriculture, by Mr. Coldstream.

JALANDHAR.

58. Coolies permanently employed on road repairs were employed also to plant; and 35,580 trees are planted out, where, is not said, nor how many succeeded.

There is allusion made to 42 little sailaba plots planted on the banks of the Sutlej (no doubt with Shísham) but 9 were washed away. This is of course the drawback to alluvial plantations ; but when it is recollected how small is the cost of planting and how easily success is assured, the drawback is not sufficient to discourage us. "These plantations are those which had been made on the unoccupied or unassessed area of river village lands, and which had not been transferred to the zemindars, under Mr. Barkley's action, whereby plantations made upon orders of his predecessors on shamilát, were handed over to the owners of the soil."

59. There is a nursery near the cantonment, which yielded 15,384 trees. 5,861 were given to the Executive Engineer for the Grand Trunk and Hushiárpur road. 1,000 were given to the Kapurthala State, 1,020 to the cantonment planting, 2,165 to zemindars and 5,308 to the road-planting above mentioned.

60. Captain Beadon remarks that the value of tree-planting is beginning to be understood, and that he has observed many little plantations in villages, in a thriving condition and that on private owner's lands. In plantations on common lands there is an universal tendency to destroy. This is natural ; contractors for Railway, and others, offer tempting prices : it only shows that the state protection of communal groves is desirable. The return sent to me speaks of *tables*, giving figures, but they do not accompany the copy, which appears to be an extract from a district fund Annual Report.

AMBALLA.

61. The information given is in a comparative-tabular form, showing work for 1875-76 and 1876-77.

In a condensed form the results may be given thus :—

Road—Ambala—Jagadri,	27	miles,—2½ miles @ 25† feet apart	—1875.
Buria—Kharwan,	3½	miles,—Gaps filled, ...	... do.
Ambala to Rupar	8	miles,—2 miles @ 14′	... do.
Marinda to Sirhind	3¼	miles, the whole @ 14′	... do.
Ludhiana to Kalka	19	miles,—Gaps filled—	1875 and 1876.
Ambala to Rupar	2	miles, Do.	... do.
Kuráh and Morinda	2½	miles,—2½ miles, @ 20′ and Gaps filled	do.
Ladwa and Badrpûr	3½	miles, @ 20 feet apart,	... 1875.
Kharundwa & Sháhábád	6	miles, with Kikar	... 1876.

* It would be interesting to print the list, but space and the cost prevents my extending the report.
† On both sides always, unless expressly stated otherwise.

62. The total cost of maintenance during 1876 of these and previously planted roads was Rs. 1603 : the cost of 1876 planting was Rs. 96/-

LUDHIANA.

63. The expenditure was Rs. 1,188-15-on planting and care of new plantings, and Rs. 4,954-13-10-on fencings and maintenance—total Rs. 6,143-12-10. 9,955 trees were planted out. The plantings are successful. The localities of planting are not indicated.

64. About Ludhiana itself are several groves, one at the entrance of the station from Ferozepur (1,500 trees, 3 years' old) three smaller ones with trees chiefly Shisham (4 years' old). A large grove or plantation is at the back of the district Kutcherry between it and the Grand Trunk Road, and contains 24,000 Shisham and 2000 other trees.

Small groves have been made near the Municipal Hall, and on the right of the road to Philor.

65. There are various alluvial groves of Shisham on the Sutlej ; here, as in Jalandhar district, they are estimated at 2,70,000 trees, but acreage would give a better idea and be more reliable.

66. There are many groves chiefly of Kikar in this district, as is well known. They contained an estimated number of 60,000 trees, some have been since cut down for fuel. There is not at present much inclination to act under the Financial Commissioner's Circular X of 1875, even though exemption from revenue of the land planted is promised.

DELHI.

67. The Commissioner, Colonel Davies, (so well-known for his interest in the subject) has furnished a good resumé of the 3 Districts in this Division, and I cannot do better than give it as it stands.

"In the Delhi District, Kikár seeds were sown along the sides of 8 of the principal District Roads, and although the seeds germinated, they were afterwards destroyed in many places by floods. The trees planted in previous year on the Bahalgarh road, are not, the Deputy Commissioner reports, thriving very well, owing to the prevalence of salt in the soil. Those on the road between the tombs of Humayon and Safdarjang are however said to be in a flourishing condition.

2. In the Tilaori plantation in the Ballabgarh Tahsil, 141 acres were, the Deputy Commissioner states, planted with Kikar, but owing to the inundation of the Jamna river, and the severity of the winter of 1876, most of the young plants were destroyed. Those that escaped are however reported to be in a thriving condition. Similarly, 182 acres of land in the Bela plantation under the city walls * were planted with Kikar and Shisham, but a number of the young trees perished from the same causes as affected the operations in the Tilaori plantation, *viz* : inundation and severe cold. Willow cuttings were also planted in both of these preserves. The 6,000 put down in the Tilaori plantation are reported to have struck, while in the Bela plantation. Of one lakh put down, about one third have failed. Transplanting of Shisham trees from the nurseries of the latter plantation was also carried out during the year, and the majority of the plants are said to be thriving.

3. Besides the above, the Public Works Department has, the Deputy Commissioner says, planted the sides of the Grand Trunk Road, the Mathra road, and the Kutab road, within the limits of the Delhi District with Kikár seeds, and the young plants are said to be progressing favorably. The Municipality of Delhi, too, devote a good deal of attention to the planting and maintenance of road-side trees. During the year a single line of trees 20 feet apart has been planted on either side of the road called the Boulevard, which leads to the Raushanara gardens. These trees are all thriving and will form before many years a magnificent avenue.

4. An effort was, the Deputy Commissioner reports, made to plant Kikár seeds on the ridge near the old Cantonments, but the experiment was unsuccessful. Another attempt will, it is stated, be made, during the coming rainy season.

Gurgaon District.

5. In the Gurgaon District, 13,906 trees were planted along road sides, and 1,807 at other places. These with the number planted in previous years made up the total of road-side trees to 47,161, and of those planted elsewhere 10,630. Of the former, 4,920 were lost during the year and of the latter 3,421. The following roads of this District are reported to have a double line of trees on each side, *viz*, the Gurgaon and Sohna road, the Ballabgarh road, and the road leading from the Civil Station to the Railway Station. I have seen these avenues and can state that they are succeeding admirably. In the first of the above-named roads, nurseries are established about a mile apart, but the trees in them have not been included in the number previously mentioned. 7,480 trees were planted on both sides of the Sohna and Palwal road of which all but 766 are said to be thriving well. In referring to the successful issue of these operations, the Deputy Commissioner says the cost has been proportionately great, as an establishment of one Máli and one Bhishti has had to be employed for each mile of road up to the present month. It is anticipated however that

* For a special report on this, for 1876, see Proceeding July 1877, No. 1. *B. H. B P.*

the expense will be considerably reduced for the future, as most of the plants have now got a fair start. There is still much to see done in the way of planting the sides of roads in this District.

Karnál District.

6. As pointed out in para. 5 of my Report for last year (1875-76), tree-planting has not been carried out in the Karnál District according to any recognized system. The Officiating Deputy Commissioner reports however that now that the rainy season is approaching the scheme suggested in paras. 19 to 92 of your letter No. 417 of 5th August 1871, to address of the Secretary to Government Punjab, will be followed up during the year under report. 1,012 trees are said to have been planted in the Karnál Tahsíl, 1,033 in the Panipat Tahsíl, and 30 in the Kaithal Tahsíl, and this is the extent to which arboricultural operations were carried out in the Karnál District. The report furnished by the Officiating Deputy Commissioner, is a very meagre one. He will be instructed to submit a somewhat fuller one for next year. Tree planting has not received the attention it should have received in this District. The sides of the District roads are remarkably bare, the necessity of doing more in this matter on a more systematic plan has been impressed on the Deputy Commissioner, and I trust I shall be able to report better progress next year. The frequent change of officers has doubtless had something to do with the neglect referred to. The District is an unpopular one and every Deputy Commissioner tries to get away from it as soon as possible."

68. The expenditure in this Division may be summarized thus :—

In Delhi, the road Establishment costs, Rs. 29 per mensem. From the Tilauri plantation Rs. 1,702 were derived as income (Rs. 178 from dead and fallen wood) and the cost of planting and maintenance was Rs. 428. The municipality expended Rs. 3,403 on tree-planting. The total expenditure was :—

District Funds	Rs. 1,115
Imperial	„ 1,272
Municipal	„ 3,403
Total Rs. ...	5,790

69. In Gurgaon, where all trees require careful nursing, Rs. 4,236 have been spent, and the Deputy Commissioner rightly remarks that under such conditions as this district presents, it is better to do a little work well. Consequently, for the planting of the 18 miles of road from Sohna to Palwal one Máli and one Bhisti were kept for each mile till the trees were considered safe.

70. In Karnál the expenditure is not stated.

Rohtak.

71. The Deputy Commissioner rightly remarks that it is best to be content with hardly indigenous trees which will grow, rather than attempt costly failures with finer species. The tamarisk is suitable to the district.

Besides planting individual trees, two experiments were made with sowing broad cast, 4 acre plots in each of the virs called Sunárwála and Chuchtukwás. A partial success, sufficient to warrant further experiment, resulted.

72. In round numbers Rs. 4,000 were spent on nursing 21,000 trees, *i. e.* 5¼ trees per Rupee.

The trees in each tahsíl are thus given :—

Rohtak	5,783	existing previously.
	790	added.
	6,573	total.
	141	failed.
	6,432	left.
Sampli	2,473	existing.
	836	added.
	3,309	total.
	39	failed.
	3,270	left.

Gohána	4,235	existing.
	1,103	added.
	5,338	total.
	478	failed.
	4,860	left.
Jhajjar	5,008	existing.
	1,969	added.
	6,977	total
	540	failed.
	6,437	left.

SIRSA.

73. In this dry district, Mr. Wakefield's report may be quoted as follows:—

Trees planted or sown in Tahsils.

1. The Tahsíl operations have been as follows:—

Trees planted or sown.

In Sirsa Tahsíl, ...	9,182	
„ Fázilka „	2,911	
„ Dabwáli „	660	
Total, ...	12,703	

Trees in the Sadr Station.

2. The Sadr station was very extensively planted the previous year, and during the year under report, dead trees were replaced and other work limited to tending and watering the trees planted the previous year.

Road-side Trees.

3. *Road-side Trees* were planted to the number of 545.

Groves of Trees in villages.

4. The groves of 8 trees in every village started two years ago have been carefully looked to, dead trees being replaced from the Sirsa and Fázilka nurseries. They are kept up by the villagers and will be their property.

Rewards for planting trees.

5. Liberal rewards have been given in cases where individual taste and labor have resulted in rearing goodly plantations. Here and there this spontaneous taste and effort is to be found, and it is always good policy to encourage such by marked reward and notice, with a view to encouraging the following of such excellent examples.

Plan for planting trees.

6. My plan of having a hole dug (circular,) 3 feet in diameter and 4 feet in depth and well filled and saturated with water *first* before the plant is put down, is answering well. In the Sadr, where it was supposed that Shísham trees would not live, about 200 trees may now be seen, averaging 6 to 7 feet in height. The store of moisture secured to commence with, at the roots, by this plan, is undoubtedly an advantage which no amount of subsequent top-watering can secure. The pits are generally filled to the brim twice or more till the hole is thoroughly saturated, and then the plant is puddled in.

Planting a Pipal Tree at every mile-stone.

7. The only new experiment which has been adopted here and which, I was gratified to see by your circular to other Districts, has earned your special approbation, is the planting a Pipal tree behind every mile stone in the District. These trees are all planted and flourishing, and are kept up by the villagers in whose lands the mile stones occur.

* * * * * * * * *

Prohibition against cutting trees.

11. The present settlement contains strong restrictions against felling trees, and according to these no man can cut down a large tree anywhere without permission first obtained through the Tahsildar from the Sadr, and there is no doubt that the restriction is a most wise and salutary one.

Extension of the rainless circle of Sindh to this Division.

12. It is a notorious fact that the tendency of the rainless tract or circle of Sindh is to *expand* and its evil influence in repelling moisture and rain extends to Bahâwalpur and the Multan Divisions, and from Bahâwalpur on the one side and the Bikaneer desert on the other, the drought circle appears often to surge over into this Division.

Rules for the preservation and production of trees should be introduced in the new Settlement.

13. The new Settlement offers a grand opportunity for the introduction of rules in every administration paper for the preservation and production of trees, both in the fields and on road sides, at village sites, tanks and wells. The people are most pliable and will agree to anything reasonable proposed. The labor required is reduced to a minimum by distribution over all the able-bodied of the village and a scheme for strict preservation, in fact the present rule on that head and another for progressive planting each year should be introduced.

Hissar.

74. In the Sadr Station, gaps in avenues were filled up chiefly with Shisham which suits the soil.

There are nurseries to supply plants in the Station garden and in the "Park," and one at the Hansi parao. An experiment was made with 'Rohira' (*Tecoma undulata*) but was not very successful, the soil being too heavy.

75. The following summary of road work may be given :—

1.—Main road near Fattehabad tahsil, additions : 320 trees now exist.
2.—Fattehabad Parao, grove of 742 Kikár.
3.—Fattehabad to Sirsa avenue, 2,000 trees added ; total surviving 468.
4.—Kangoi nulla, both banks, Kikár sowing : 1,000 trees now existing and thriving.
5.—Tohana to Barwala, 2,000 existing and 7,000 added—1,200 survive. (On this road it is difficult to protect from goats.)
6.—Barwala to Hansi, 1,050 and 2,500 added : 1,672 survive.
7.—Barwala to Hissar, 1,000 Kikar sowing : 1,835 survive in all.
8.—Tohana to Rattia, 500 Kikar sowing : 325 survive in all.
9.—Grove in the road (No. 5) 100 added : 507 do.
10.—Two groves on (No. 6) additions failed : 250 do.
11.—Sowing of Kikar with a few successful plants near the Punchakki at Hansi, at Sikandarpur and on the road from Hansi to Hissar.
12.—Hansi to Mehum, 126 added successfully to avenue.
13.—Hansi to Gohana, 113 added sucessfully.
14.—At each of the 10 Police rest-houses, trees are grown and an Establishment kept to water them : they all are doing well, being fenced with thorns.

CANALS.

The following divisions have sent their reports :—

Lower Sutlej and Chenab Division.

76. In the Chenáb Sub-Division, the trees are planted on the spoil banks of the Wali Mahomed and Sikandrabad canal and on the Chenáb band, the latter suffered from floods. I would suggest in that case the use of Willows in preference to other species. In other places no doubt the cultivation of fruit-trees and of good timber-trees as Shisham, Kikár and Tún takes the first place.

Here as in most divisions the number of self-sown trees is very great.

77. I cannot help suspecting however that the elaborate "Revenue return No. XII" cannot be correct : the labor of really counting these trees as in a forest valuation survey must be very great. (*See also para.* 82).

In the Chenáb Sub-Division, there were 8,791 trees planted out as against 4,099, the previous year, and 43,721 self-sown trees of which Shisham and Kikár are in the large majority, Tamarisk and Mulberry following next.

The Sutlej Sub-Division had 4,132 trees planted out and 53,202 naturally grown trees.

78. The income derived from grass and from fuel and timber are as follows :—

	Rs.	As.	P.
Grass	3,382	7	3
Fuel and timber	3,961	0	3
Total Rs. ...	7,343	7	6

The expenditure was :—

Establishment	1,271	9	8
Planting &c., ...	297	12	8
Total Rs. ...	1,569	6	4

There are thus a surplus of Rs. 5,774/1/2, the timber sales were increased by a number of Shisham blown down near Multán ; these fetched good prices.

Dera Ghazi Khan (Indus) Canals.

79. There were 17,465 trees planted out, 78 per cent. being Shisham, 14 per cent. Kikár, and there were 789 mangoes. Mr. Ivens' remarks on the best species are entirely correct. This is *par excellence*, the country for Shisham ; Siris is not worth cultivating, and Tún if it will succeed is very valuable as wood. Some years hence, trees that can be spared will be found to fetch high prices. Already Shisham fetches 8 annas to 1/4/. per cubic foot in the standing tree, according to age and size.

80. Nurseries are maintained at all the Choukies, 44 Bhisties were kept up, each man watering 582 trees : but Mr. Ivens thinks he will be able to reduce this charge (as is desirable), by arranging to water a greater number of trees from the nearest distributory. The total expenditure was Rs. 5,000 ; nothing is said of any income.

81. There are as usual a large number of self-sown trees, but a classified table of these species shows a large *decrease*. Thus in 1876-77 there were 73,708 trees, of which 20,086 were Palms (*Phœnix sylvestris* or perhaps *P. dactylifera*, but not *P. acaulis*,) 18,425 *Tamarix articulata* with considerable but much smaller numbers of Bér, *Salvadora* (jál), Kikar, Shisham, Jand (*Prosopis spicigera* wrongly called *Sacharum*) and Siras. There are also 96 trees of *Excœcaria sebifera* (Tallow tree) which will doubtless spread ; the number of Mulberry is small (221). In 1875-76 there were 86, 835 trees in all or 13,127 more. According to the table the chief decrease has been in Tamarisk by 10,000, (unless this is a clerical error which is possible as 1876 gives 18,425, and 1,875, 28,143). The Kikár and Siras also diminished, and the Jand and Jál. The Palms and Shisham *increased*.

Upper Sutlej Inundation Canals.

82. The Executive Engineer has declined the classified table on the ground that the countings are unreliable. I myself think that it would be much better to abandon what must either be incorrect, or be an enormous labor. On the other hand, it is easy to give an accurate statement of (*a*) the number of *nurseries* kept to supply plants, stating acreage, (*b*) area of groves, gardens, or plots (*c*) linear length of trees in double, single, or more rows as the case may be, adding from ocular inspection, an estimate of the prevailing species, and stating whether the area is fully stocked or the lines complete without gaps, as the case may be.

83. In the Divisions alluded to, we have the following lengths in miles ; the stock is in large part self-sown : Kikár, Shisham and Bér are the prevailing species :—

Katora Canal	66	miles	Lahore district.
Khanwáh Canal	81	„	Lahore and Montgomery.
Do. N. Rajbuha	18	„	Montgomery.
Do. S. do.	12	„	Do.
Do. Bháwal Dass Rajbuha ...	5	„	Do.
Upper Sohag Canal	57	„	Lahore and Montgomery.
Do. Banga Sahiwál Rajbuha ...	5	„	
Do. Baperwál Rajbuha ...	7	„	

Lower Sohag Canal, no planting as yet.

Bari Doab 1st Division.

84. During the year, 35,355 plants, chiefly Tún and Mulberry, were planted out on canal and Rajbuha banks. This number of Tún is very satisfactory as it will become very valuable in time. Also 165 grafted Bombay Mangoes were established